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State of the Environment Report

Wildlife

Alberta
ENVIRONMENT

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Key Report Findings

- In recent years, the term "wildlife" has been broadened to encompass all wild species including both plants (vascular and non-vascular) and animals (vertebrate and invertebrate). This State of the Environment report examines the current status or well-being of Alberta's wildlife, the pressures acting on this resource and some of the actions being taken to mitigate such pressures.
- Alberta is a province of diverse and abundant wildlife. Wildlife is important as a component of biodiversity and the ecological processes that sustain all life. This natural resource also produces economic benefits and is valued for its recreational and aesthetic uses.
- Wildlife managers use a number of tools to determine whether wildlife populations are secure. One of these tools, the general status review process, ranked 625 species including most of Alberta's vertebrates and for the first time, some plants and invertebrates. Of those species ranked, two per cent were classified "at risk," nine per cent "may be at risk," 18 per cent were "sensitive" and the remaining 71 per cent were "not at risk." After formal review, individual species at risk might also be added to legislation to provide a degree of legal protection. Currently, there are five endangered and seven threatened species or subspecies listed under Alberta's Wildlife Act.
- As the number of humans and their activities increase, wildlife populations face an increasing number of pressures. These pressures can be direct (e.g. mortality of individual animals) or indirect (alteration, fragmentation or outright loss of wildlife habitat). Agriculture, forestry, resource extraction, corridor development, urban expansion, harvest (hunting, fishing and trapping) and recreation are widespread activities that impact wildlife and their habitat in Alberta.
- Just as wildlife is diverse in Alberta, so too are the number of actions being taken to protect this valuable resource. Some of the approaches to mitigating human-induced pressures on wildlife include establishing parks and protected areas, retaining wildlife corridors in multiple land-use zones, integrating wildlife management plans with other land use practises, adapting harvest strategies, restoring wildlife habitat and identifying and establishing recovery plans for species at risk.
- With more and more users competing for a fixed land base, habitat issues -(and thus wildlife issues) will continue to grow in complexity in the future. Ensuring wildlife populations remain secure is the responsibility of all Albertans and will require the integration of resources and the expertise and commitment of governments, individuals and organizations across the province.

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Preface

What is State of the Environment (SOE) Reporting?

State of the environment reports are produced by many municipal, provincial/state and federal governments, in many countries around the world. Environment Canada and Statistics Canada collaborated on Canada's first State of the Environment report in 1986. Provincial SOE reports generally follow guidelines published by the Canadian Council of Ministers of the Environment (CCME). Such reports describe environmental conditions and trends, important pressures acting on the environment and actions being taken to address these conditions and pressures.

The purpose of State of the Environment reporting is to provide timely, accurate and accessible information on ecosystem conditions and trends, their significance and societal responses to such trends.

The Government of Alberta is committed to informing Albertans about the environment and produces many reports on Alberta's environmental resources. Under the *Environmental Protection and Enhancement Act*, the Minister of Environment is required to report annually on the state of the Alberta environment. This provides valuable information to the public and ensures accountability for the management of this shared resource.

Alberta published its first SOE report in 1994 - a comprehensive report discussing air, water, land and wildlife, with sections on forested lands, mineral resources, agricultural lands, wetlands, protected areas and waste management. Subsequent SOE reports focused on specific themes including waste management, aquatic ecosystems, terrestrial ecosystems and air quality. In addition, fact sheets are produced periodically, focusing on specific topics such as urban air quality and duck populations. Education about the environment is an important goal of Alberta's SOE reports. In addition to facts and figures, these reports feature background history and science to help readers interpret the information presented. Environmental indicators - key measurements that can be used to monitor, describe, and interpret change - are often highlighted in SOE reports.

Did you know?

Alberta's wildlife includes approximately 92 mammal, 370 bird, 10 amphibian, 8 reptile and 60 fish species.

Did you also know?

Alberta's wildlife also includes approximately 1,823 vascular plants, 1,272 mosses and lichens and 20,000 insect species.

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Purpose and Scope of this Report

Albertans have a strong appreciation of their natural resources and are fortunate to have enjoyed a legacy of diverse and abundant wildlife. The health of wildlife populations and their habitat reflects the health and diversity of our shared environment. In turn, a healthy environment is important to our own state of health and well-being. The purpose and scope of this report is:

- to examine the current state of Alberta's wildlife;
- to examine some of the pressures that are acting on Alberta's wildlife; and finally,
- to review some of the actions being taken to alleviate or mitigate such pressures.

Definitions

Wildlife — a term comprising the wide range of wild plants and animals that exist without taming or cultivation by people. Alberta's wildlife includes many species of mammals, birds, fish, amphibians, reptiles, plants (including flowering plants, mosses, lichens, etc.) and invertebrates (worms, snails, spiders, beetles, etc.).

Species — classification of individuals that share common attributes and can interbreed with one another.

Habitat — the food, water, shelter and space an animal or plant needs to live.

1.0 Introduction

1.1 Why Focus on Wildlife?

Albertans have a close association with wildlife and the habitat that we share with them. A quick look at the number of fishing licences purchased in 2000 (208,364) or the thousands of enthusiasts who participate annually in nature hikes, Christmas bird counts, owl prowls, bird festivals, May Day species counts and other events around the province and it is obvious - Albertans value wildlife! In a 1996 survey, Environment Canada estimated that 88.9 per cent of Albertans 15 years of age and over took part in a wide range of nature-related activities. Wildlife also has an economic benefit. The Importance of Nature to Canadians reports that Alberta residents spent $1.2 billion on nature-related activities in 1996, including outdoor activities in natural areas, wildlife viewing, fishing and hunting (Federal-Provincial Task Force on the Importance of Nature to Canadians 2000). In the same year, these activities supported 23,600 jobs in Alberta.

The value placed on wildlife often depends on the user. Through time, Albertans have valued wildlife for different reasons. Alberta's first inhabitants were nomadic hunters, who followed game north as glaciers retreated approximately 12,000 years ago. For several thousand years, the province remained sparsely populated and the consumption of wildlife had little impact on wildlife populations. Although Anthony Henday is credited as the first European to tread on Alberta soil (in 1754), the fur trade had reached Alberta about 80 years prior. Native bands from throughout the west travelled by canoe to York Factory on the Hudson's Bay coast to trade muskrat, otter, marten, fox, mink and beaver pelts for domestic goods and guns. The fur trade provided a demand for wildlife and guns increased the ability to supply this demand. This changed the value of wildlife from one of strictly local consumption to include commercial gain. Game was killed for the value of its fur as well as for food.

As competition in the fur trade increased, both the Northwest and Hudson's Bay Companies built trading posts in Alberta. By the time the first detachments of Northwest Mounted Police were established at Edmonton and Fort Macleod in 1874, the once-thriving bison herds were already largely exterminated. Settlers began to arrive in Alberta at this time and increased when the Canadian Pacific

Did you know?

The May Day Species Count is an annual survey of birds, mammals and plants in flower. Surveys are carried out at locations around the province on the last complete weekend in May. For more information, contact your local bird or natural history club, or contact the Federation of Alberta Naturalists at (780) 427-8124 or 11759 Groat Road, Edmonton, Alberta T5M 3K6.

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Railway pushed across the prairies in the 1880s. While the fur trade placed tremendous pressure on fur-bearing wildlife, the settlement of Alberta also placed a heavy toll on game animals that provided fresh meat to newly arrived settlers. Some species, such as pronghorn antelope, were severely over-hunted. Many settlers took up commercial fishing to make it through hard economic times in the 1930s, resulting in the overharvest of many fish species. Some wild species, like elk, were domesticated. Others, like mink and fox, were raised on fur farms. Predator species, like wolves and many birds of prey, were deemed "pests," and eradication programs were undertaken. And a few "exotic" (non-native) species, including brook and brown trout, ring-necked pheasants and gray partridge, were brought into the province from other areas.

Today, while consumption and economic gain are values still placed on some wildlife, values have broadened to include a number of non-consumptive uses and activities such as bird watching, hiking in natural areas and nature photography. Wildlife is also viewed in broader terms - including a wider range of plant and animal species. Even more importantly, there is a greater recognition of the role wildlife plays in biodiversity and the very ecological processes, like pollination and seed dispersal, carbon sequestering, and air and water filtration, that are paramount to human existence. Wildlife species are important environmental indicators and their health reflects the health and diversity of the environment we share with them.

Unfortunately, many of the aesthetic and ecological values associated with wildlife are not easily assigned economic values and do not fit easily into accounting systems. For this reason, it is important for Albertans to stay well informed about wildlife issues. Issues, such as proposed federal species at risk legislation, changes to Alberta's *Wildlife Act*, or additions to parks and protected areas, should be of interest to all Albertans who ultimately benefit from and share the responsibility for a healthy and sustainable wildlife resource.

Shortly after Alberta became a province in 1905, a provincial Game Branch was established and legislation was passed to establish the basic tools for game management, including licensing and season closures. Provincial responsibility for wildlife wasn't formally transferred from the federal government until the *Natural Resources Transfer Act* (Alberta) in 1935. Over the years, responsibilities have widened to include monitoring the well-being of a diversity of wild species. Today, Alberta Sustainable Resource Development, under the auspices of the *Wildlife Act*, the federal and provincial *Fisheries Acts*, and with numerous partner agencies and individuals, works to ensure our wildlife is managed and maintained in a healthy and sustainable manner.

What is the state of wildlife in Alberta today? Following is a look at some of the wildlife in Alberta, including a variety of plants (non-vascular and vascular) and animals (invertebrate and vertebrate). Also included are some of the direct and indirect pressures influencing the state of Alberta's wildlife and some of the actions being taken to mitigate such pressures.

Vascular plants

Vascular plants such as coniferous trees, flowering plants and ferns have a specialized water transport system that is absent in non-vascular plants like mosses, liverworts and lichens.

Vertebrate species

Vertebrate species, including fish, amphibians, reptiles, birds and mammals, possess a backbone that is absent in invertebrate species such as worms, crayfish, insects, snails clams, etc.

1.2 Setting the Stage: Alberta Natural Regions

While the focus of this report is on wildlife - ecosystems, natural regions and particular habitats are equally important when discussing the state of this resource (e.g. the condition of prairie wetlands is a major factor in the nesting success of ducks and geese in the grassland natural region). Alberta is a province with a great deal of variation in its geographical regions (Figure 1), which include mountains, foothills, forests, and prairies - as well as lakes, rivers, streams and wetlands. Similarly, its wildlife is diverse (Table 1). While some species like the red-winged blackbird and the prickly rose can be found throughout the province, others, like the prairie short-horned lizard and the western small-footed bat, are found only in specific regions or in specialized habitat. A good way to focus on wildlife is to look at Alberta's natural regions with an overview of the flora (plants) and fauna (animals) of each. Similarities in landforms, geology, soils, and climate can be used to classify six natural regions in Alberta.

Figure 1

Alberta's Natural Regions

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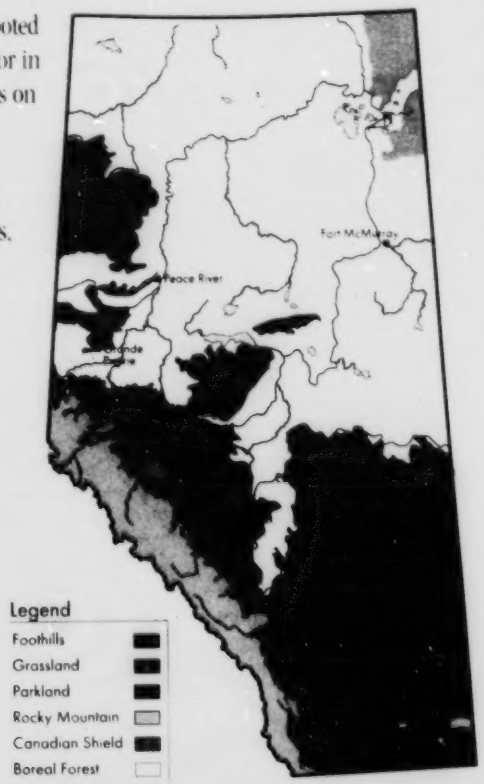


Table 1.0

The Diversity of Alberta's Wildlife Species

Vertebrate Groups	Approximate number of species in Alberta
mammals	92
birds	370
amphibians	10
reptiles	8
fish	60
Invertebrate Groups	
clams	27
butterflies & skippers	170
dragonflies & damselflies	72
beetles, ants, wasps, flies, lacewings, cockroaches, spiders and other "bugs"	20,000
Lower Plant Groups	
mosses & liverworts	627
lichens	645
fungi	454
Vascular Plants	
trees	28
shrubs	162
forbs	1,222
grasses & sedges	411

Grassland Natural Region

The Grassland Natural Region is 96,221 sq. km (or 14.5 per cent - Figure 2) of Alberta and is comprised of flat to gently rolling hills covering glacial deposits over bedrock. This region extends west to the Rocky Mountains and north to the Parkland of central Alberta. Although large areas of short (blue grama), mid-sized (spear grass, western wheat grass and June grass) and fescue grasses are predominant, treed river valleys, deeply eroded coulees, hoodoos, wetlands, shallow lakes and sand dunes are also present.

Photo Credit: Gordon Court

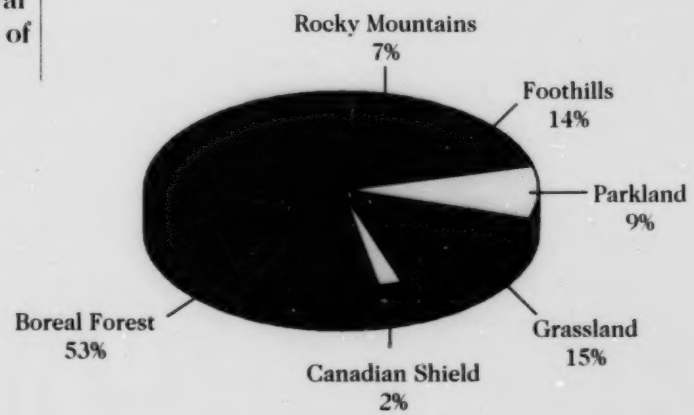
Major rivers draining the area include the Milk, Red Deer, Bow, Oldman and South Saskatchewan Rivers. The Milk River is a part of the Missouri River drainage system and has three fish species that do not occur in other drainages in the province, including stonecat, western silvery minnow and shorthead sculpin.

The prairie climate provides warmer and drier summers and milder winters in the Grassland region than in other areas of Alberta. Historically, the Grassland provided large tracts of habitat for a number of unique species (including pronghorn antelope, American badger, Ord's kangaroo rat, prairie falcon, prairie rattle snake, yucca and prickly pear cactus) that are adapted to its warm, dry conditions. Today, however, conversion for cultivation, transportation, oil and gas extraction and urban development has altered as much as 75 per cent of the Grassland Natural Region, reducing the habitat available for many wildlife species.

Figure 2

The area of each natural region as a percentage of Alberta's total area

(Alberta Environment 1997)



Prairie Rattlesnake

The prairie rattlesnake, once subject to intense persecution from humans, is now becoming more recognized as an important component of Alberta's Grassland Natural Region. This species is still relatively common within its habitat in southeastern Alberta, but has declined in similar habitat in Saskatchewan and British Columbia. At the northern extreme of its distribution in Alberta, the rattlesnake relies heavily on its den site to survive through long, cold winters. Communal dens may contain many individuals, and may include other species such as bull snakes and garter snakes. Public education has helped to change attitudes towards this species and in some areas, rattlesnakes are appreciated for their role in regulating rodent populations.

Photo Credit: Lorne Fitch

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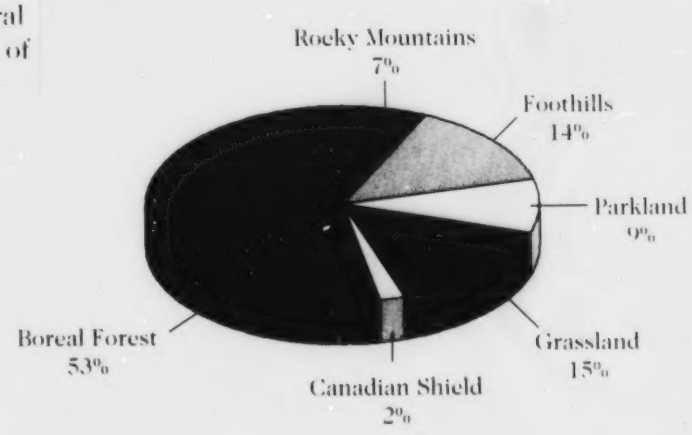

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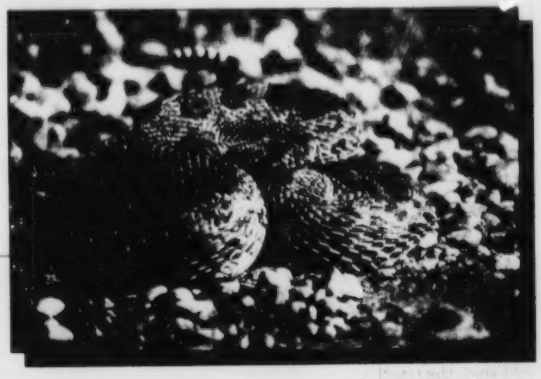

Plains Prickly Pear Cactus

The prickly pear is one of three species of cactus that grows in Alberta. The prickly pear's bright, yellow flowers and sharp, barbed spines make it hard to miss among the prairie grasses and sagebrush found throughout the southeast part of the province. Other cactus species include the brittle prickly pear and pincushion cactus.

Parkland Natural Region

The Parkland Natural Region, an area of approximately 62,307 sq. km, forms a transition zone between the grasslands to the south and boreal forest to the north. It is comprised of large areas of level glacial deposits changing to gently rolling plains as it approaches the foothills to the west. River valleys include the Red Deer, Battle and North Saskatchewan. Lakes are common with the largest being Beaverhill, Buffalo and Pine Lakes. Saline wetlands are numerous.

Lake Sturgeon of the Saskatchewan River System

Lake sturgeon is a unique species inhabiting only two Alberta river systems. The population in the North Saskatchewan River system is vulnerable, with fewer than 1,000 individuals. The population in the South Saskatchewan River system is relatively stable but has less than 5000 individuals. Lake sturgeon are slow growing, but because they can live beyond the age of 80 years, they can weigh more than 45 kg. The Alberta angling record is 47.7 kg.

Groves of trembling aspen and balsam poplar, shrublands and grasslands characterize the region's vegetation. Animal species include a combination of prairie (upland sandpiper, Baird's sparrow and Sprague's pipit) and boreal (woodchuck, broad-winged hawk and rose-breasted grosbeak) species. Other common species include northern pocket gopher, least weasel, common porcupine and red fox. The Parkland Region is the most densely human-populated natural region. Land use patterns associated with agriculture, energy resources and urban expansion have altered as much as 95 per cent of this region.

Beaverhill Lake

Beaverhill Lake, a large, prairie "slough" located in Alberta's Parkland Natural Region, is internationally recognized for its diversity and abundance of bird life. Most recently, the lake was designated Alberta's first *Important Bird Area*. As a significant migratory stopover for waterfowl and shorebirds, Beaverhill is host to thousands of snow geese every spring as witnessed by the thousands of birders attending the annual Snow Goose Festival. This area is also utilized by thousands of neotropical songbirds migrating to their breeding grounds further north. The Beaverhill Bird Observatory (BBO), located on the southeast corner of the lake, studies these and other natural history events in the area. For more information, contact the BBO at P.O. Box 1418, Edmonton, Alberta T5J 2N5.

Foothills Natural Region

The Foothills Natural Region is a transition zone of folded sedimentary rock between the Rocky Mountains and the Boreal Forest. Rolling landscape extends north in a widening belt of approximately 94,529 sq. km along the eastern edge of the Rocky Mountains, from Turner Valley to the Grande Cache area. As well, several outlying areas, including the Swan Hills, Pelican Mountains and Clear Hills are included in this region. Lakes in the foothills tend to be small, but larger lakes include Buck, Crimson, Moonshine and Musreau Lakes. Wetlands are common in low-lying areas. The region is drained primarily by the Smoky, Athabasca, Pembina and North Saskatchewan Rivers.

Forests of lodgepole pine and mixedwoods of aspen and spruce are typical. The foothills harbour a number of resident forest birds, including boreal chickadees, white-winged crossbills and spruce grouse. The foothills also provide habitat for a number of large mammals (such as elk, caribou, and grizzly bear), and a number of smaller species such as bull trout and long-toed salamander. Although the area is sparsely populated by humans, land use is high in this region of productive forests, significant oil and gas deposits and diverse recreational opportunities.

Controversy surrounds Grizzly Bear hunt

Grizzly bears are a majestic symbol of vast, rugged and pristine habitats found in the mountains, foothills and boreal forests of Alberta. However, the grizzly population is small (approximately 1,000 animals) and spread over a relatively wide area. While the issue of hunting grizzlies sometimes makes news headlines, the increasing loss of secure, high quality habitat to recreational developments and resource extraction are the major factors affecting this species' health and well-being in Alberta.

Plains Prickly Pear Cactus

The prickly pear is one of three species of cactus that grows in Alberta. The prickly pear's bright, yellow flowers and sharp, barbed spines make it hard to miss among the prairie grasses and sagebrush found throughout the southeast part of the province. Other cactus species include the brittle prickly pear and pincushion cactus.

Parkland Natural Region

The Parkland Natural Region, an area of approximately 62,307 sq. km, forms a transition zone between the grasslands to the south and boreal forest to the north. It is comprised of large areas of level glacial deposits changing to gently rolling plains as it approaches the foothills to the west. River valleys include the Red Deer, Battle and North Saskatchewan. Lakes are common with the largest being Beaverhill, Buffalo and Pine Lakes. Saline wetlands are numerous.

Lake Sturgeon of the Saskatchewan River System

Lake sturgeon is a unique species inhabiting only two Alberta river systems. The population in the North Saskatchewan River system is vulnerable, with fewer than 1,000 individuals. The population in the South Saskatchewan River system is relatively stable but has less than 5000 individuals. Lake sturgeon are slow growing, but because they can live beyond the age of 80 years, they can weigh more than 45 kg. The Alberta angling record is 47.7 kg.

Groves of trembling aspen and balsam poplar, shrublands and grasslands characterize the region's vegetation. Animal species include a combination of prairie (upland sandpiper, Baird's sparrow and Sprague's pipit) and boreal (woodchuck, broad-winged hawk and rose-breasted grosbeak) species. Other common species include northern pocket gopher, least weasel, common porcupine and red fox. The Parkland Region is the most densely human-populated natural region. Land use patterns associated with agriculture, energy resources and urban expansion have altered as much as 95 per cent of this region.

Beaverhill Lake

Beaverhill Lake, a large, prairie "slough" located in Alberta's Parkland Natural Region, is internationally recognized for its diversity and abundance of bird life. Most recently, the lake was designated Alberta's first *Important Bird Area*. As a significant migratory stopover for waterfowl and shorebirds, Beaverhill is host to thousands of snow geese every spring - as witnessed by the thousands of birders attending the annual Snow Goose Festival. This area is also utilized by thousands of neotropical songbirds migrating to their breeding grounds further north. The Beaverhill Bird Observatory (BBO), located on the southeast corner of the lake, studies these and other natural history events in the area. For more information, contact the BBO at P.O. Box 1418, Edmonton, Alberta T5J 2N5.

Foothills Natural Region

The Foothills Natural Region is a transition zone of folded sedimentary rock between the Rocky Mountains and the Boreal Forest. Rolling landscape extends north in a widening belt of approximately 94,529 sq. km along the eastern edge of the Rocky Mountains, from Turner Valley to the Grande Cache area. As well, several outlying areas, including the Swan Hills, Pelican Mountains and Clear Hills are included in this region. Lakes in the foothills tend to be small, but larger lakes include Buck, Crimson, Moonshine and Musreau Lakes. Wetlands are common in low-lying areas. The region is drained primarily by the Smoky, Athabasca, Pembina and North Saskatchewan Rivers.

Forests of lodgepole pine and mixedwoods of aspen and spruce are typical. The foothills harbour a number of resident forest birds, including boreal chickadees, white-winged crossbills and spruce grouse. The foothills also provide habitat for a number of large mammals (such as elk, caribou, and grizzly bear), and a number of smaller species such as bull trout and long-toed salamander. Although the area is sparsely populated by humans, land use is high in this region of productive forests, significant oil and gas deposits and diverse recreational opportunities.

Controversy surrounds Grizzly Bear hunt

Grizzly bears are a majestic symbol of vast, rugged and pristine habitats found in the mountains, foothills and boreal forests of Alberta. However, the grizzly population is small (approximately 1,000 animals) and spread over a relatively wide area. While the issue of hunting grizzlies sometimes makes news headlines, the increasing loss of secure, high quality habitat to recreational developments and resource extraction are the major factors affecting this species' health and well-being in Alberta.

Photo Credit: Gordon Court

Rocky Mountain Natural Region

The Rocky Mountain Natural Region is part of a major uplift forming the Continental Divide. In Alberta, this region occurs in a broad belt (46,140 sq. km) of rugged, mountainous terrain, ranging from 10 km wide near Waterton Lakes National Park to more than 100 km at its widest point. Elevations rise from 2,100 m in the east to 3,700 m in the west. (The highest peak in Alberta is Mount Columbia, at 3,782 m). Several rivers originate in the area including, the Crowsnest, Bow, North Saskatchewan, Athabasca and Smoky Rivers.

Vegetation types are varied, but in general: alpine sedges and dwarf shrubs grow on poorly developed soils or rock at higher elevations; evergreen forests of lodgepole pine and Englemann spruce grow at middle elevations; and mixed forests (aspen and spruce) and grasslands occur at lower elevations. Similarly, wildlife varies with elevation. Hoary marmots, grizzly bears and mountain goats occur at mid-mountain and higher elevations, and blue grouse, mountain chickadees and black bear inhabit lower elevations. Human land-use in this region relates mainly to tourism, outdoor recreation and coal mining.

Boreal Forest Natural Region

The Boreal Forest composes the largest natural region (346,012 sq. km or 53 per cent of the province) in Alberta and consists of a broad, lowland plain with discontinuous hill systems interspersed with numerous wetlands. This region has several large lakes including the largest in the province (Lake Athabasca), as well as Lake Claire, Lesser Slave Lake, Lac La Biche, Utikuma, Wabamun and Cold Lakes. The Boreal region also has the world's largest inland freshwater delta occurring at the confluence of the Peace and Athabasca Rivers. The Peace River, which originates in northeastern British Columbia, has several fish species in its upper portion that are not found elsewhere in the province, including northern squawfish, redside shiner and largescale sucker.

Did you know?

A mountain goat can stand on a ledge as small as 15 cm (6 in.) long and 5 cm (2 in.) wide. In Alberta, approximately 2,100 mountain goats can be found in the mountains and river complexes of the eastern slopes. Hunting closures and transplants have been instrumental in this species' recovery from a population decline in the 1970s.

Peace-Athabasca Delta

The Peace-Athabasca delta is the world's largest inland freshwater delta. It is home to a variety of species, including the peregrine falcon, a species renowned for its return from the brink of extinction. Environmental concerns regarding regulated river flow, pulp mill effluents, municipal and agricultural activities and other development in the area led to the initiation of the Northern River Basins Study (NRBS) in 1991. This study set out to determine the quality of the water, fish and fish habitat, vegetation, wildlife and hydrology of the Peace, Athabasca and Slave Rivers. The NRBS released its report in 1996, making several recommendations for preserving the area's aquatic resources. The report can be obtained from the Alberta Environment Information Centre or on-line at http://www3.gov.ab.ca/env/water/nrbs/response/.

Climate in this region is characterized by short, cool summers and long, cold winters. Aspen-dominated forests including black spruce bogs on wetter sites and mixedwoods on drier sites are characteristic vegetation. Jack pine dominates sandy areas. Highly diverse, the boreal region hosts a variety of wildlife. It is the summer breeding grounds for a large number of neotropical songbirds, including many warblers and thrushes. As well, it is the year-round home of many animals, including owls, woodpeckers, lynx and moose. Human activity is expanding rapidly in this region, as heavy and conventional oil and gas development, timber harvesting and agricultural activities increase.

What are Neotropical Songbirds?

The Boreal Forest Natural Region is the summer residence of a large number of neotropical songbirds, including Swainson's thrush and chestnut-sided warbler. These birds migrate north to the boreal forest to breed, but spend the majority of the year in Central and South America. (Neotropical migrants, like some bat and butterfly species, also migrate south for the winter.) Awareness of these birds has increased in recent years through news reports on habitat loss and fragmentation of their breeding and wintering grounds. Volunteer projects like the Breeding Bird Survey, Alberta Bird Atlas and Migration Monitoring Network are dedicated to monitoring the well-being of songbird populations. As well, government, industry and academia have initiated several research projects to better define the habitat needs of these species.

Rose-Breasted Grosbeak Photo Credit: Gordon Court

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Rose-Breasted Grosbeak

Canadian Shield Natural Region

The Canadian Shield Natural Region occupies the far northeast corner of Alberta where the Canadian Shield geological formation enters the province - an area of approximately 15,976 sq. km. Jack pine woods and rock barrens characterize the area. Lake Athabasca splits the region in two. North of the lake, glaciated bedrock provides low relief. To the south, extensive sand plains, sand dune complexes and moraines are found. The Athabasca River is the only major drainage of this region. Climatically, the region experiences warm and dry summers and long, cold winters. As a result of poor soils, ground cover consists mostly of lichens and mosses. Black spruce forests are typical in wet bog areas. Wildlife species are similar to the adjacent Boreal Forest Region, including lynx, bear and moose. Numerous lakes in the area are home to many fish species, including slimy sculpin, lake trout, northern pike, spottail shiner and walleye. Sparsely populated, most land-use activity in this region is tied to subsistence harvest. However, the potential for mining precious minerals may be developed in the future.

Did you know?

Alberta has 21 different species of sphagnum moss. Sphagnum forms the dominant vegetation in many boreal lowland habitats, where it has the ability to hold large quantities (up to 20 times its own dry weight) of water. Sphagnum moss can also alter the acidity and decomposition rate of its surrounding habitat, thus to some extent, controlling the presence or absence of other species around it. Peat moss used in our gardens or flower beds, extracted from local peat operations, probably belongs to the genus Sphagnum.

2.0 The State of Alberta's Wildlife Today

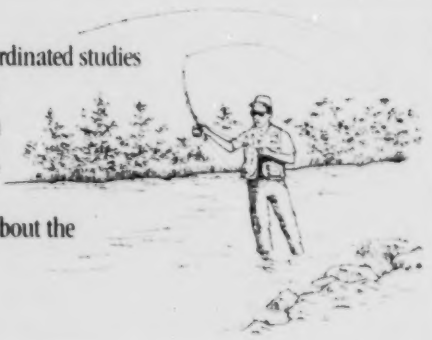
2.1 Introduction

What is meant by the "state of" and how is this condition measured as it pertains to Alberta's wildlife? Generally, discussing the "state of" something, appraises or evaluates its well-being or "status." In the case of wildlife, this often involves not only the health of the particular species but its habitat (food, water, shelter and space) as well.

In order to measure the condition of wildlife, a number of systems have been put into place by the Alberta government and its partners to monitor populations and provide information to wildlife managers. For game species (species that are hunted, fished or trapped), a system of licensing, harvest questionnaires and game surveys are used to monitor populations. The information collected through these tools is used to assess the game species' condition, looking at factors like productivity, mortality and overall population size. Current, accurate and complete data helps wildlife managers set sound harvest quotas for the coming year.

A Few Good Anglers Wanted!

The Survey of Recreational Fishing in Canada is a series of nationally co-ordinated studies conducted by Canada's federal, provincial and territorial fisheries agencies. Surveys have been conducted at five-year intervals since 1975 to develop an understanding of, and trends in, Canada's sportfishery. For the 2000 survey, questionnaires were mailed to a random sample of 6,000 anglers who purchased Alberta sportfishing licences in that year. Questions were asked about the anglers' experience, opinions and fishing activity, including location, frequency and time spent fishing for 17 of Alberta's fish species.



Another system used to assess the well-being of wildlife is the *general status review* process. In 1982, the Minister responsible for fish and wildlife committed to assessing the status of Alberta's fish and wildlife, including both game and non-game species, every five years. The general status review process uses a

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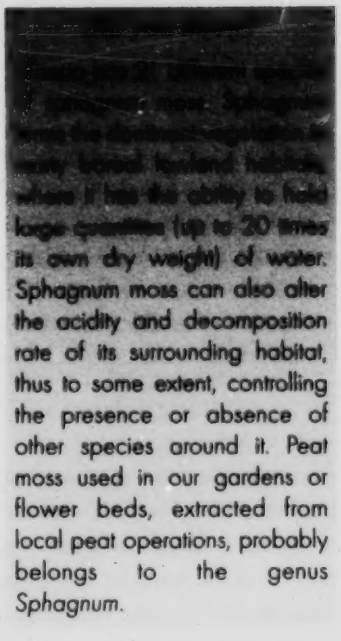

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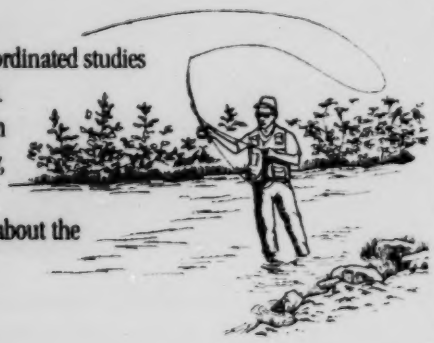

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"coarse sieve" approach to quickly assess which wildlife populations are secure and which may be at risk of declining to non-viable population numbers. The first report - the *Status of Alberta Wildlife* published in 1984 - dealt mainly with vertebrates. In subsequent reports in 1991 and 1996, the Fish and Wildlife Management Division refined the process, increasing the number of species assessed, as well as the number of participants (university researchers, conservationists, species experts, etc.) in this consultative process.

"As interest in wildlife has grown and broadened, and our understanding of the value and need to maintain undisrupted and diverse ecosystems has increased, the need to understand the biological status of all wildlife has become essential."

From The Status of Alberta Wildlife. (Alberta Environmental Protection 1996)

Categories Used in the General Status Review Process

At Risk

Any species known to be at risk (declining to non-viable levels) after formal assessment.

Sensitive

Any species known to be, or believed to be, particularly sensitive to human activities or natural events.

Status Undetermined

Any species where not enough information exists to use the ranking system.

In 2000, the review process ranked 625 species and for the first time included some plants and invertebrates. Results are published in a series of *Status of Alberta Wildlife* reports, as well as in a national report - *Wild Species 2000: The General Status of Species in Canada*. The national report was created by the Canadian Endangered Species Conservation Council as the first step in fulfilling a commitment of the *Accord for the Protection of Species at Risk* to "monitor, assess and report regularly on the status of all wild species" (Canadian Endangered Species Conservation Council 2001).

While assessing the status of wildlife species every five years is the first step in determining future management needs, the process is sometimes limited by the availability of species information. For many uncommon plants and animals, data collection programs like the Alberta Natural Heritage Information Centre or the Biodiversity Species Observation Database (BSOD) work to collect historical and present-day occurrence data. These data are then analysed, evaluated, mapped and made available to wildlife managers and others involved in conservation initiatives in Alberta.

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Wild Species 2000: The General Status of Species in Canada ranks 1,600 Canadian species in a unified process across the provinces, territories and ocean regions. This first effort at a national ranking program is believed to include about two per cent of Canada's known species (more than 70,000 species have been described to date), leaving many more species to be examined in the future. Results of this and future reports are available at http://www.speciesatrisk.gc.ca.

Did you know?

Did you know Alberta has 27 different species of bivalves? The term "bivalve" is a common name for an animal with a shell consisting of a pair of right and left valves connected by a flexible ligament. Bivalves include both clams and mussels. To find out more about bivalves, the Alberta Natural Heritage Information Centre (ANHIC) is collecting data on seven of the more uncommon species in this group. To report a sighting, visit http://www.cd.gov.ab.ca/preserving/parks/anhic/bivalvetrk.asp.

Did you also know?

There are 36 different types of willow that grow in Alberta. Some grow to a height of only a few centimetres, but some grow as tall as 10 metres. Most are found in moist meadows and woods or along slough margins and streambanks. ANHIC is currently compiling information on all of the vascular plants occurring in the province. To date, this information has been used to include Alberta's ferns and orchids in both the provincial and national status review processes.

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At Risk Any species known to be at risk (declining to non-viable levels) after formal assessment.
May be at Risk Any species believed to be at risk.
Sensitive Any species known to be, or believed to be, particularly sensitive to human activities or natural events.
Not at Risk (or Secure) Any species known to be, or believed to be, not at risk.
Status Undetermined Any species where not enough information exists to use the ranking system.
Not Assessed Any species that, for one reason or another, has not yet been assessed against the criteria.

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Case Study

Subject **Moose** (*Alces alces*); "twig eater"

Challenge Use hunter harvest data and population surveys to determine if this species is declining in Alberta.

Description The largest member of the deer family, the moose is dark brown to black on the upper parts, fading to lighter, sometimes grey tones on the lower legs. A long, "horse-like" head on a short neck ends in a "humped" nose. The upper lip noticeably hangs over the lower lip and a "dewlap" or bell hangs from the throat. Shovel-shaped (palmate) antlers are found on the bull only.

Distribution With a population of approximately 110,000 individuals, moose are found throughout the province except for the southern prairies.

Habitat Moose are often associated with the boreal forests of the north, however they often frequent river valleys (e.g. the Red Deer River) well into the south. Moose prefer areas of young willow and aspen but will also browse a wide variety of plants, often near lakeshores, streamsides and peatlands. Adult moose browse mostly on twigs and branches but will also feed on submerged vegetation.

Life Cycle Young moose reach maturity in their second or third year, however, young bulls may not have the opportunity to breed until they are five or six. A cow moose, after an eight month gestation period (moose breed or "rut" in the fall), will give birth to one to three calves in May or June. Calves start to follow their mothers at about two weeks of age. They are weaned by the fall but remain with the mother until she calves again in the spring. Moose have been known to live up to 27 years.

Management Concern over the number of moose in the province led to the initiation of a five year study - the Northern Moose Management Program - in 1992. In an effort to better understand population density, distribution and reproductive rates, government biologists surveyed large portions of Alberta's moose habitat. During the same period, hunters were asked to submit moose jaws to researchers to provide information on the age and sex of animals harvested by Albertans each year. The information obtained from these actions helped managers determine that bull numbers had declined in some areas. A number of changes in harvest regulations were made: fine-tuning the characteristics of individual management units, and taking into account a more numerous human population that has gained more access to moose habitat in recent years. In the 2000 general status review process, this species was ranked "not at risk" and in fact, moose are currently expanding into areas in the parkland and northern prairies.

Species Outlook With continued management and co-operation between users, this species' outlook is very good.

2.2 Stable Wildlife Populations in Alberta

What is a "stable" population? When assessing wildlife, researchers usually look at two measures to determine if the species is stable or if changes have occurred. "Distribution" is the extent of area the species occupies. "Population size" is the number of individuals in a population. If population size is expressed as the number of individuals within some measurable unit of area, it is called "density." For example, white-tailed deer are considered to be a relatively stable species in Alberta. A population size of approximately 200,000 individuals can be found in a distribution that covers most of the province (an area approximately 660,000sq. km), for a density of approximately one white-tail for every 3.3 sq. km. Although short-term, cyclical fluctuations may occur, stable populations tend to maintain about the same number over the long term.

Researchers may look closer at distribution to determine the number of sites where the species occurs within the distribution. Similarly, they may break down population size estimates to measure only the number of breeding individuals. Data collection and evaluation provides managers with the information they need to assess the condition or state of wildlife in Alberta. If a species is expanding or declining to its detriment, wildlife managers need to know this in a timely manner so that appropriate management actions can be taken.

In the past, efforts to determine which species were stable tended to focus on game populations. In recent years, however, this has been expanded to include a broader diversity of wild species. In the 2000 general status review process, 57 mammals, 230 birds, 3 amphibians, 27 fish, 4 ferns, 11 orchids and 109 butterflies were ranked as "not at risk" (Table 2). A "not at risk" or "secure" population is one where numbers are either stable, or not increasing or decreasing to an extent that places the species in jeopardy. Information for many plants and invertebrates is still lacking, however, and many species were not assessed in 2000. Fortunately, this process is ongoing and will continue to broaden to include a larger number of wildlife in the future.

A population may be stable, yet still have a small distribution or density. Many orchid and fern species in Alberta are distributed over a wide area, but are rarely abundant and usually occur only in small, isolated patches. Many prairie species, like western spiderwort and Great Plains toad, reach the northern extent of their distribution in southern Alberta. Hence, their numbers are never large here but may be greater further south. Some species, such as pelicans and cormorants that nest on islands, have very narrow habitat requirements. Species such as these may require special management to address concerns related to low natural

Table 2.0

The Number of Species Ranked in the General Status Review Process

Category/Status	Not at Risk	Species of Concern	May be at Risk	At Risk	Extinct	Total Assessed
Mammals	57	10	6	3	1	77
Birds	230	50	2	7	3	292
Amphibians	3	3	3	1	0	10
Reptiles	0	5	3	0	0	8
Fish	27	7	4	1	1	40
Ferns	4	12	27	0	0	43
Orchids	11	6	8	0	0	25
Butterflies	109	20	1	0	0	130
Totals	441	113	54	12	5	625

populations or number of occurrences, limited provincial distribution, or particular habitat needs. Although their numbers are stable, they may need special protection or management actions to ensure they remain secure.

What do stable populations indicate? Individually, a population that is stable and secure indicates the species is healthy and has the resources it needs to exist. Many stable and secure populations, taken together, might indicate a particular habitat, landscape or ecosystem is healthy. Considering wildlife species as indicators is a relatively new process used to assess the health of particular habitats, landscapes, or whole ecosystems. Such models might use ducks and aquatic insects to measure wetland health, marten and woodpeckers to measure old growth forest viability or aspen regeneration, and songbird numbers to measure how quickly a disturbed forest returns to its natural state.

Ducks and Wetlands in Alberta

A secure duck population indicates a healthy wetland ecosystem. Conversely, a population decline indicates that stresses occurring in the environment are adversely affecting ducks and their ability to reproduce. During the 1980s, drought and increased cultivation around wetland margins combined to eliminate many wetlands and the upland nesting habitat surrounding them. Without adequate cover, predation on ducks increased and nesting success declined. Programs like the North American Waterfowl Management Plan work to restore the balance between waterfowl and their habitat, benefiting a number of other wetland species at the same time. (See *Duck Populations: An Ecosystem Indicator* (Alberta Environmental Protection 1997))

Photo Credit - Gordon Court

Table 2.0

The Number of Species Ranked in the General Status Review Process

Mammals	57	10	6	3	1	77
Birds	230	50	2	7	3	292
Amphibians	3	3	3	1	0	10
Reptiles	0	5	3	0	0	8
Fish	27	7	4	1	1	40
Ferns	4	12	27	0	0	43
Orchids	11	6	8	0	0	25
Butterflies	109	20	1	0	0	130
Totals	441	113	54	12	5	625

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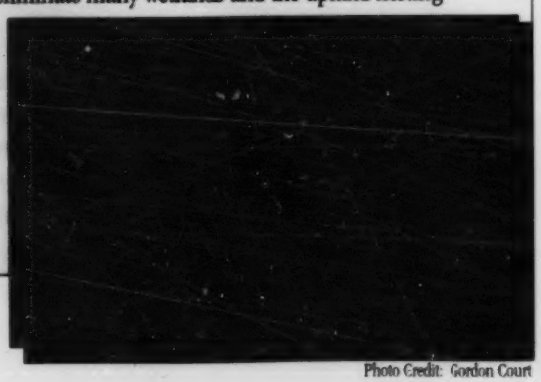

Photo Credit: Gordon Court

2.3 Expanding Wildlife Populations in Alberta

If a species' density and/or distribution increases over a sustained period of time, the population may be expanding. For example, raccoons are not only becoming more numerous in the river valleys and agricultural areas of southern Alberta - they have also expanded their range and have been observed as far north as Cold Lake. Expansions are often the result of human actions that alter a particular factor, making expansion favourable for a particular species. For many years, industrial corridors were re-seeded with a clover mix that was especially attractive to increasing numbers of grazing deer. In urban areas, species that have a high tolerance for man's activities, such as black-billed magpies and house sparrows, appear to thrive. However, natural factors can also play a role in changing a species distribution. For example, drought conditions in the southwestern states may be the reason why black-necked stilts have expanded northward into southern Alberta. Sightings of this distinctive shorebird have increased in Alberta in recent years. Stilts are now a confirmed breeder in several areas, including Beaverhill Lake southeast of Edmonton and areas near Calgary and Taber.

In some cases, increases in numbers and/or expansions in distribution might be seen as positive, such as for game species. Higher deer populations allow more opportunity for hunters to harvest this species. Increases in recovering populations, such as the peregrine falcon, can indicate that a limiting factor (in this case, the pesticide DDT) has been removed from this species' habitat, allowing it to recover to its previous population size. However, many increases in wildlife populations are cyclical or short-term and natural processes like predation, disease or inclement weather soon act to correct the balance. Balance is important in nature. Unchecked growth would see a natural population soon outgrow its food and shelter, and might result in an increase in disease. Unchecked growth usually indicates something is wrong in the ecosystem. For example, with the demise of the prairie wolf, coyotes have increased unchecked by their former predators. They often come into conflict with urban and rural residents in the Parkland region.

An expanding species may also create stress on other species by out-competing them for limited resources. Although bull trout have declined primarily as a result of overfishing, they also face competition from introduced brown, rainbow and brook trout. Another example of negative expansion is when exotic species are introduced into non-native habitat. Non-native weeds, like scentless chamomile and purple loosestrife, compete for habitat, displace native plants and alter ecosystems. Some introduced bird species, like house sparrows and European starlings, compete with native bluebirds and tree swallows for food and nesting

cavities. Non-native insects, such as the Asian long-horned beetle which has no natural predators in Alberta, could potentially be imported in packing and shipping material and could seriously damage the province's forests. The illegal introduction of threespine sticklebacks into Hasse Lake has seriously altered the lake's native fish species composition. In general, the expansion of non-native species usually has negative effects on existing native species.

Table 3.0

Examples of Exotic Animals and Plants

[illegible]	Eastern gray squirrel, black rat, Norway rat, house mouse
[illegible]	gray partridge, ring-necked pheasant, house sparrow, European starling, rock dove (pigeon), wild turkey
[illegible]	brook trout, brown trout, golden trout, dolly varden, sockeye salmon, three-spine stickleback, mosquitofish, sailfin molly, smallmouth bass, African jewelfish
[illegible]	leafy spurge, scentless chamomile, purple loosestrife, Eurasian milfoil
[illegible]	cabbage white butterfly, European skipper

Sometimes, what appears to be an expansion is actually the result of new data; the species' distribution may not have changed. For example, the Alberta Bird Atlas Project recorded the calliope hummingbird breeding in the upper Wapiti River near Grande Prairie; it had previously only been recorded as far north as Jasper National Park. Recent inventories of the Canadian Shield Natural Region confirmed Arctic terns, usually found further north, nesting within the northeast corner of the province. As well, new information can provide evidence of greater population numbers or density than previously known. Due to a lack of knowledge for this species, the long-toed salamander was included on the red list (at risk) in 1991. However, extensive surveys in the 1990s led to an increase in the number of known individuals and this species was downlisted to yellow (may be at risk) in 1996.

House sparrow Photo Credit: Gordon Court

Collected by more than 1,000 volunteers over a five-year period, Atlas data provides a snapshot of Alberta's breeding bird distributions. This data was published in book format in 1992 and can also be accessed electronically. The Atlas data is currently being updated as the Federation of Alberta Naturalists (FAN) undertakes the second five-year data collection period started in 2000. For more information or to volunteer your birding skills, visit www.fanweb.ca or contact FAN at 11759 Groat Road, Edmonton, AB. T5M 3K6

Aside from short-term fluctuations, and recovering endangered species like the peregrine falcon and swift fox, one would expect few native species to be increasing in size or distribution. Natural limiting factors such as competition, predation and disease should keep populations in balance. As well, because of their potential for harm, Albertans should be vigilant against inadvertently introducing exotic species into the province.

2.4 Declining Wildlife Populations in Alberta

Sometime, a species' numbers decrease or its distribution gets smaller over a period of time. Researchers must collect long-term data to determine if the change is only temporary or a long-term trend. Although there are many reasons for population numbers to decline, the most prevalent cause in Alberta today is the loss or alteration of habitat, causing food, water, shelter or space to become a limiting factor. The Grassland Natural Region is one of the most altered regions in Alberta, and more than one-half of the species considered at risk in Alberta depend on prairie habitats. Similarly in the north, woodland caribou is an example of a sensitive species that is increasingly encroached upon by industrial and recreational activity.

Other reasons for a decrease in wildlife populations include disease, predation, overharvest and competition from other species. Disease is a natural part of any ecosystem, but certain conditions may trigger increases in occurrence. In the summer months, if temperatures are warm and lake levels low, botulism, a dangerous type of food poisoning caused by toxins from a bacterium, may affect

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Woodland Caribou

Woodland caribou rely on large tracts of mature or old growth forest that supplies them with abundant lichens - their favoured food. The clearing or conversion of forest for agriculture, mining or resource extraction and the reduction of large patches of undisturbed, mature forest by forest management practices has negatively affected woodland caribou populations in Alberta. The number of individuals remaining in the province is estimated at between 3,600 and 6,700. In some situations, human activities in the forest have left behind too large a "footprint." Several initiatives between industry and government are working to mitigate some of this impact, avoiding activity during sensitive periods and regulating the type and amount of development in primary caribou habitat. However, until some of the "footprint" is removed from the forest, the woodland caribou is likely to remain a threatened species.

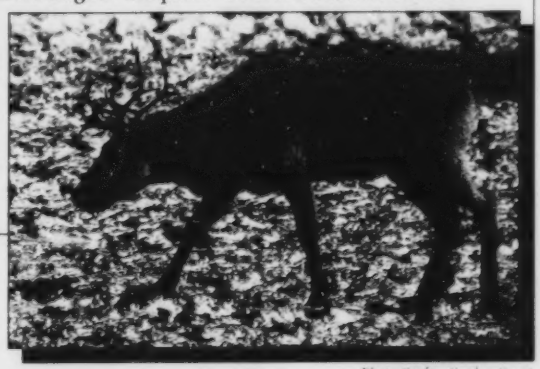

Photo Credit: Gordon Court

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Predation is another natural process and is necessary to keep populations in balance. Sometimes, however, predation increases to the detriment of the prey species. For example, successive mild winters can lead to an increase in pine beetles whose developing larvae affect trees like lodgepole pine. Similarly, increasing industrial development in the northern forests has made access to caribou herds easier for wolves, with a corresponding increase in rates of predation.

Sometimes, a population experiences a combination of factors that drastically reduces its numbers. A winter of heavy snow makes browsing difficult for deer species. Add higher than normal hunter harvest or predation from wolves, harsh weather, disease or parasite load, and the population may decrease substantially. Under normal conditions, wildlife usually rebound from population lows. However, with increasing pressure on wildlife from habitat loss and disturbance, the effect of natural factors may become magnified. Complex interactions between two or more limiting factors are often poorly understood for many wildlife species requiring long periods of intense study before the correct management actions can be determined.

If a species has been assessed and found to have decreased in number, or if there is concern about a species but there is insufficient information about its status, the species may be listed in one of several categories that imply it is a species of concern. Categories range from "sensitive" species that require monitoring, to species that are "at risk" - requiring immediate action to keep them from imminent extinction or extirpation. In the 2000 general status review process, 179 species of birds, mammals, amphibians, reptiles, fish, ferns, orchids and butterflies were identified to be of concern and placed in the categories of at risk (12), may be at risk (54) and species of special concern (113).

After a formal review process (see page 40 - Species at Risk), species at risk might also be legally defined as "endangered" or "threatened" species under the *Wildlife Act*. Currently, there are five endangered and seven threatened species or subspecies listed in Alberta.

Formal legislated categories for species at risk

Endangered - A species facing imminent extirpation or extinction.

Threatened - A species likely to become endangered if limiting factors are not reversed.

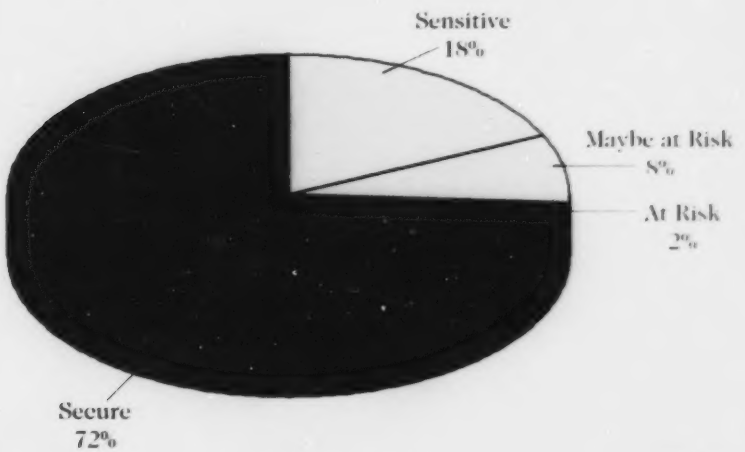
Species currently listed under the Wildlife Act

Endangered - swift fox, bison, whooping crane, sage grouse, piping plover.

Threatened - woodland caribou, barren ground caribou, northern leopard frog, trumpeter swan, ferruginous hawk, peregrine falcon, burrowing owl.

Figure 3

The percentage of species in each status category



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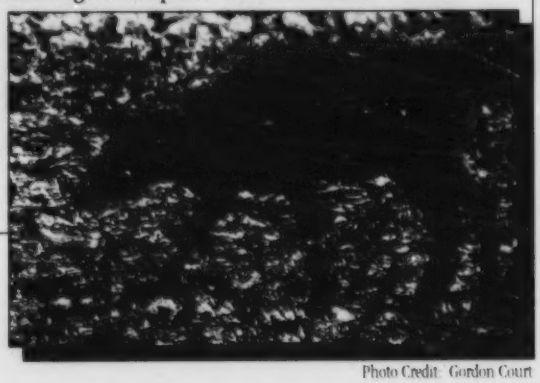

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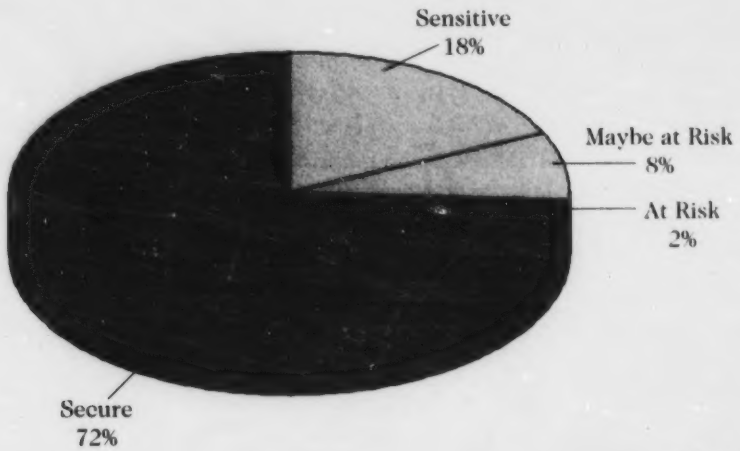

2.5 Summary of the Present State of Wildlife in Alberta

While many of Alberta's wildlife populations appear to be healthy, it is difficult to estimate the total number of wild species that are currently secure or at risk, because a large number of species, particularly invertebrates, have insufficient population data and/or have not yet been examined. (Remember that Table 1 indicated more than 24,000 species of wildlife in Alberta!)

For species whose general status was reviewed in 2000, two per cent (12 of 625) are at risk and in need of immediate action to keep them from becoming extinct or extirpated (see Appendix II). Another nine per cent (54 of 625) may be at risk and require management or further study to keep them from becoming at risk. Many (27) of the species in this category are ferns that have small known distributions and specialized habitat requirements. A further 18 per cent (113 of 625) are "sensitive" species that should be monitored to ensure they do not decline. A large number (50) of sensitive species are birds. The remaining 71 per cent of species reviewed are not believed to be at risk and are secure for the time being. However, they will be reviewed again in 2006 when the next general status review process begins. Because wildlife populations are not static, populations that are stable today may undergo expansions or declines in the future, hence monitoring programs must be ongoing and inclusive.

Why do we categorize wildlife?

Assigning wildlife species to various categories such as "may be at risk" or "sensitive" is like using radar - it alerts us to a species condition, hopefully before it becomes irreversible and influences what actions are needed in the future. This allows wildlife managers to be proactive - managing endangered species as well as working to ensure sensitive species never get to the endangered stage. It also allows managers to prioritize actions - effectively utilizing limited resources and manpower. With human populations and economies expanding, many wildlife-related issues are expected to become more complex in the future. Establishing an ongoing, effective process to assess the status of wildlife is paramount to ensuring its survival in the future.

Burrowing owl Photo Credit: Gordon Court

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3.0 Pressures on Alberta's Wildlife

3.1 Introduction

As human populations and economic activities increase, wildlife species face an increasing number of pressures or stresses on their populations. Pressure can arise from factors that affect individuals directly, like harvesting (hunting, fishing or trapping), or indirectly, from the alteration, fragmentation or outright loss of habitat that can limit food, water, shelter and space. Whatever the cause, pressures on wildlife can result in disease, starvation, reduced or complete interruption of reproduction, or outright mortality. When a number of individuals of a species fail to reproduce sufficiently, or mortality claims a large proportion, the overall population may decline.

3.2 Direct Pressures on Alberta's Wildlife

Harvesting

When settlers first came to Alberta, they hunted, fished and trapped many wildlife species for their meat or furs. Today, while some subsistence harvesting still occurs, these activities are carried out as commercial and recreational pursuits as well. Thus, harvesting continues to place pressure on big game (moose, deer, elk), upland game birds (pheasants and grouse), waterfowl (ducks and geese), fish (trout, pike, walleye) and fur bearers (beaver, mink, fox). Utilizing the fish and game resource incurs a cost. This cost must be managed properly and according to sustainable use principles to avoid affecting the long-term health and viability of harvested species. For many species, harvesting, in the form of hunting, fishing and trapping, has been managed successfully in Alberta for almost 100 years. (For more information on hunting and fishing in Alberta, visit the Government of Alberta website at http://www3.gov.ab.ca/srd/fw.)

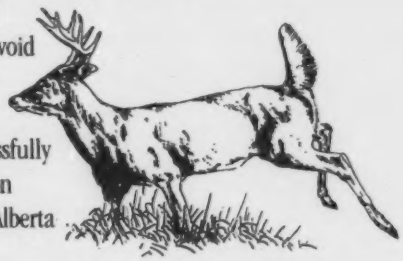


Table 4.0

Alberta Game Animals

Big game	white-tailed deer, mule deer, moose, elk, bighorn sheep, mountain goat, pronghorn antelope, grizzly and black bear, cougar, coyote, wolf
Upland game birds	ring-necked pheasant, gray partridge, Merriam's turkey, ruffed grouse, blue grouse, spruce grouse, sharp-tailed grouse, willow and white-tailed ptarmigan
Furbearers	beaver, muskrat, red squirrel, badger, fisher, marten, mink, otter, ermine and weasels, wolverine, coyote, red fox, arctic fox, gray fox, wolf, lynx, bobcat
Sportfish	northern pike, walleye, sauger, perch, lake trout, rainbow trout, brook trout, brown trout, bull trout, cutthroat trout, golden trout, Arctic grayling, lake whitefish, mountain whitefish, sturgeon, goldeye, burbot
Waterfowl and other migratory game birds	Geese: Canada goose, snow goose, Ross' goose, black brant, white-fronted goose Ducks: wood duck, mallard, black, green-winged teal, blue-winged teal, cinnamon teal, pintail, wigeon, redhead, shoveller, greater and lesser scaup, ring-neck, common and Barrow's goldeneye, common, red-breasted and hooded mergansers, ruddy duck, Other: coot, Wilson's snipe, yellow, Virginia and sora rails

Definition of Sustainable Use

Use of a resource that meets the needs of the present without compromising the ability to meet the needs of the future.

Of all the different types of harvest, fishing is probably the most significant in Alberta. While participation in hunting has steadily decreased in the past two decades, participation in sport fishing remains high. Approximately 208,000 Albertans purchased a fishing licence in 2000 (an estimated 143,000 seniors and youths not required to purchase licences also take part in fishing activities every year).

In 1995, the *Survey of Recreational Fishing in Canada* estimated that 232,465 licensed anglers in Alberta fished for 3.7 million angler-days and caught 15.3 million fish, keeping only 4.6 million of the fish they caught (see Berry 1997). These anglers spent $312 million in Alberta. The most sought-after fish species are perch, northern pike, trout and walleye. In Lesser Slave Lake alone, the annual walleye harvest is estimated at 100,000 kg (split between 65 per cent sport fishing, 30 per cent commercial fishing and 5 per cent subsistence harvest).

Case Study

Subject **Walleye** (*Stizostedion vitreum*); "pickerel"

Challenge "To recover and sustain walleye populations and to provide domestic, recreational, commercial and economic benefits to Albertans."

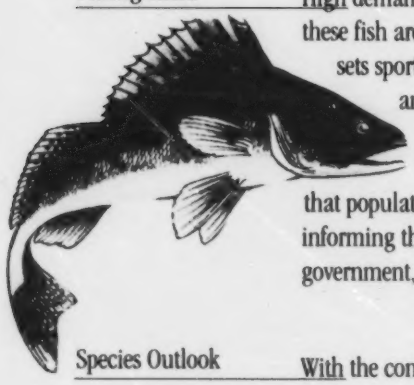
Description The largest member of the perch family and one of Alberta's most popular sport fish, walleye are olive-yellow, torpedo-shaped fish, with sharp dorsal fin spines and distinctive white tips on their anal fin and lower tail lobe.

Distribution Walleye are found in approximately 240 lakes and rivers throughout the province.

Habitat Walleye have very specific food and habitat requirements. They are a cool-water species - occupying larger lakes and rivers with maximum water temperatures of 23° C, low light penetration, abundant food and dissolved oxygen concentrations greater than 3 mg per litre.

Life Cycle Mature walleye migrate up inlet streams to spawn shortly after ice break-up in April or May. Male and female walleye mature at about seven and nine years of age respectively. Females release as many as 77,000 eggs per kg of weight over prime spawning area. The male follows close by to fertilize the eggs, and eggs hatch in about three weeks. However, less than one per cent of walleye eggs will survive to become adults. Newly hatched young, called fry, drift for four to five days before they start feeding on zooplankton. As they grow, fry will switch from zooplankton to insects and small fish, becoming the top predators in their food chain. Walleye can live up to 30 years of age.

Management High demand resulted in the collapse of walleye populations in several of the 240 water bodies where these fish are found. To protect and enhance walleye and other fish species, the Alberta government sets sportfishing and commercial regulations that restrict the size and take of catch for all anglers. In water bodies where the walleye population has collapsed or where re-stocked populations need time to become established, only catch-and-release fishing is allowed. These restrictions allow the number of walleye surviving to spawning age to increase so that populations can again become self-sustaining. Protecting walleye habitat and educating and informing the public about the need for protecting walleye populations are two other actions that government, conservation groups and community organizations work together to achieve.



Species Outlook With the continued co-operation of users and managers, the outlook for this species is fair.

Unfortunately, many areas of the province are beginning to show the effects of increasing harvest pressure. In the Eastern Slopes, where streams are cold, nutrient poor, and fish are slow growing, the numbers of anglers doubled between 1990 and 1994. Anglers and biologists alike are concerned about the small size of trout in this region. This concern led to a public review process and new regulations for this area in 1998. Similar concerns with walleye and pike populations throughout Alberta have led to new regulations and management plans for these species as well.

Game harvest by recreational hunters, though declining in numbers, is also still an important activity for many Albertans. In 1999, there were 93,719 wildlife certificates sold, down from a high of 166,191 in 1980. These certificates are required for anyone wishing to hunt wild game. White-tailed deer are the most commonly hunted big game species and more than 30,000 were harvested in 1999. As well, over 14,000 mule deer, and 6500 moose were harvested that year. Other big game species include elk, antelope, bighorn sheep, cougar, black bear and grizzly bear. Birds hunted in Alberta include ducks, geese, and upland game birds such as grouse and pheasants.

The trapping of furbearers for their pelts also remains a viable industry in Alberta. In 1999, 2,300 trappers harvested 119,928 pelts. Although 17 species were trapped, three species (red squirrel, coyote and beaver) accounted for 78 per cent of all pelts. Economically, pelts held a value of $1.9 million, down from $2.2 million the previous year. Coyote, beaver and marten pelts accounted for 84 per cent of the total economic value. For the most part, trapping is a sustainable industry in Alberta and much of our population information on furbearers comes from trappers. For less common species such as otter, quota systems that limit the number of animals harvested by each trapper are used to ensure populations remain secure.

Disease, Competition and Starvation

All wildlife species are subject to pressure from natural factors such as disease, competition, predation or starvation. In fact, these pressures often play an important role in regulating population size. For example, owl populations often fluctuate in response to the availability of small rodents in an ongoing predator-prey cycle. Sometimes, however, these pressures may be exacerbated by conditions such as the weather. Outbreaks of anthrax, occasionally infecting bison and rarely other animals, usually occur when rainy weather is followed by a hot, dry summer. Pronghorn antelope populations fluctuate widely, depending on the severity of the prairie winters. Over time, however, nature has a way of balancing these factors - adverse conditions reverse themselves and populations return to "normal."

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Table 5.0

Examples of Wildlife Diseases

Mammals	anthrax, rabies, tuberculosis
Birds	avian botulism, avian cholera, West Nile virus
Fish	whirling disease
Plants	Dutch elm disease, armillaria root disease, aspen canker, western gall rust

3.3 Indirect Pressures on Alberta's Wildlife

Loss or Alteration of Habitat

The largest threat to wildlife today is the alteration, degradation, fragmentation or loss of habitat. Although loss of habitat may not result in immediate death, it indirectly affects populations by limiting requirements like food or shelter. Individuals may eventually die (increased mortality) or fail to reproduce (decreased productivity), causing population numbers and distribution to decline. If the decline continues, the species may become extirpated or extinct. Habitat loss or alteration occurs in many forms in Alberta.

Extirpated

a species that no longer exists in the wild in Alberta but is found elsewhere. The swift fox was extirpated in Alberta but transplants from populations that occur elsewhere have successfully reintroduced this species.

Extinct

a species that no longer exists anywhere in the world. Examples include the passenger pigeon and the black-footed ferret.

Agriculture

Farmers and ranchers were the original settlers of Alberta, particularly in the south where wide open prairies looked favourable for cultivation and grazing. Today, with the help of irrigation, agriculture has become an important part of Alberta's economy and farm operations occupy about one-third of the province's landbase. Alberta is the top beef producer in Canada and cattle ranches represented 41 per cent of all Alberta farms in 1991. Dominant crops in Alberta include wheat, barley, oats, tame hay and canola.

Although the production of food is very important, it can have negative impacts on wildlife. Large tracts of native prairie (estimated as high as 75 per cent) have been converted for human uses, reducing the living space for many species, including the plains grizzly and plains wolf. Livestock may outcompete native grazers like deer, or may overgraze sensitive plant species like western blue flag. As much as 60 per cent of the wetlands in settled areas of Alberta have been lost, often drained to increase the area under production; reducing the available habitat for waterfowl, shorebirds and many other aquatic species. Pesticides,

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applied to more than 15 million acres in 1991, are used to protect monoculture crops, but at the expense of other native grass or broadleaf species found in naturally diverse habitats. Pesticides can also lose their effect, with unwanted species gaining resistance. Pesticides, fertilizers and waste (manure) disposal can contaminate water supply for all wildlife. Fortunately, landowners have a vested interest in ensuring their lands (and the wildlife that shares it) remain healthy in perpetuity. Land stewards are constantly looking for ways to meet production in an economically and ecologically sustainable manner.

Western Blue Flag Photo Credit Joyce Gould

The Land Stewardship Resource Centre

For more information on sustainable land stewardship including tips, programs, contacts and resource materials, visit the Land Stewardship Resource Centre on-line at http://www.landstewardship.org.

Case Study

Subject	**Western Blue Flag** (*Iris missouriensis*)
Challenge	Working with landowners, design a conservation management plan that protects this species and its habitat.
Description	The western blue flag is a member of the iris family. Flowers are a pale blue-violet, with nine segments (three sepals, three petals and three enlarged styles). Purple veins radiate from a yellow spot on the outer sepals. Plants are 30-60 cm tall, with pale blue-green leaves 10-40 cm long and 5-10 cm wide. Leaves grow from a thickened, dark-coloured rhizome and are folded in half lengthways.
Distribution	Found in the wet meadows and shorelines of the foothills, western blue flag is common where conditions are suitable south of the U.S.-Canada border but is at the northern extent of its range in southwestern Alberta. Only six populations are known in the province - all in an area from the western edge of the Milk River ridge to west of Carway and north of Okotoks.
Habitat	Western blue flag occur on level or slightly sloping ground where there is full sun and abundant subsurface moisture in the spring (usually the edges of wet meadows or seepage springs), but drier conditions in the summer.
Life Cycle	A long-lived perennial, blue flag has a thick, underground rhizome that allows populations to maintain themselves for long periods of time. Flowers occur only under favourable conditions and are cross-pollinated by insects. An oblong seed capsule splits down three sides when it is mature, releasing seeds to the wind for dispersal.
Management	Western blue flag is limited by its specific habitat requirements and by the loss of this habitat to agriculture (drainage, overgrazing and cultivation) and urban and industrial development. In Alberta, the *Wildlife Act* was amended in 1997 to allow for the designation, protection and recovery of threatened and endangered plants. Western blue flag will be the first plant to be considered for this designation. It is currently designated as "threatened" by the Committee on the Status of Endangered Wildlife in Canada. Meanwhile, the implementation of a provincial management plan calls for the co-operation of government, conservation groups and landowners. Sites where this and other native plant species occur can be protected by acquisition or conservancy agreements. Natural sites of scientific interest can be designated as "historic sites" or "environmentally significant areas," or given protection under the *Provincial Parks Act* or the *Wilderness Area, Ecological Reserves and Natural Areas Act*. Municipalities can control conflicting land uses under their jurisdictions and landowners can ensure overgrazing, cultivation or alteration of drainage patterns does not occur in these areas.
Species Outlook	Western blue flag was likely never common in Alberta and this is unlikely to change. Co-operation between stakeholders can, however, ensure this and other native plant species remain a part of the Alberta landscape. This species' outlook is fair.

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Cows and Fish Project

The Cows and Fish Project is an excellent example of how landowners can protect shorelines and other wetland areas for the benefit of wildlife and all Albertans. Cows and Fish is a farm and ranch-based, province-wide educational program possible through collaboration between agriculture and conservation groups and government partners. The program started out with a few small fencing projects in the foothills that prevented grazing cattle from eroding stream banks and muddying the water. Less muck and clear water made it possible for fish to spawn again in many foothills headwaters. The project has grown to involve thousands of Alberta ranchers in the past 10 years and now encompasses many management techniques that promote the protection of healthy watersheds without the loss of quality grazing area.

Forestry

Just as agriculture has a dominant impact on wildlife in southern Alberta, harvesting and clearing forests for lumber, pulp and paper production, or to make way for other types of industrial development, has a dominant impact on wildlife in the foothills and northern boreal forests. According to *The State of Canada's Forests*, approximately one half (38.2 million hectares) of the province's landmass (64.4 million hectares) is forested and 87 per cent of the forest resource is on provincial lands (Canadian Forest Service 1998). The forest resource in Alberta is made up of softwood (44 per cent) and hardwood (33 per cent) and some mixedwood (23 per cent). Wood pulp (43 per cent) and softwood lumber (33 per cent) make up the majority of products exported mainly to the United States (65 per cent) and Japan (17 per cent).

Did you know?

In 1996, 20 million cubic metres of timber were harvested from an area of 55,830 hectares in Alberta. Insect defoliation occurred on another 337,784 hectares and forest fires burned 1,961 hectares

For the most part, Crown forests are managed under *Forest Management Agreements* that detail allowable cut and other agreements between a forestry company and the province. Reviewing the status of all Crown forests harvested in Alberta between 1975 and 1995, *The 1998 State of Canada's Forests* reports that 63 per cent (506,000 hectares) were "stocked" (forest cover met timber-production standards) and 37 per cent (295,000 hectares) were "understocked" (yet to receive forest management treatments such as site preparation, planting, seeding or weeding to meet established forestry standards).

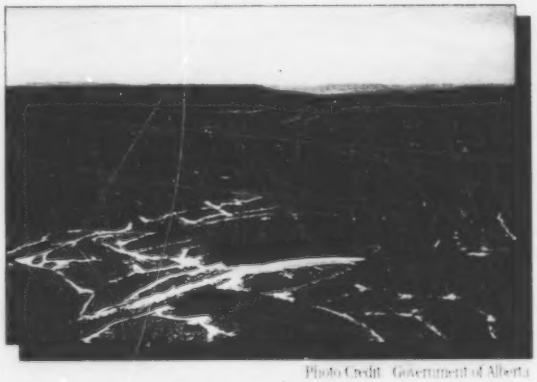

Photo Credit: Government of Alberta

So, what effect do forestry-related activities have on forest wildlife? While once considered a vast and endless resource, it is becoming more and more apparent that the forest landscape has its limits and is coming under pressure from increased human activities. Altering the age class and structural characteristics of large tracts of mature forest impacts the species that rely on them. Woodland caribou, for example, live deep in the forest where lichens are present and predators are few, and pileated woodpeckers prefer

older mixedwood forests, with standing dead trees for nesting and fallen branches and trees for feeding. As well, if improperly managed, harvesting forests can negatively affect watersheds and the fish and other organisms that use them. While forestry operations likely have many impacts on wildlife, projects like the Foothills Model Forest mitigate these impacts where possible.

Mission Statement - Foothills Model Forest

"We are a community of partners dedicated to providing practical solutions for stewardship and sustainability of our forested lands."

Trembling Aspen

The ability of trembling aspen to shoot up suckers from wide-spreading roots makes it one of the first plants to invade land cleared by fire, flood or man-made activities. Aspen stands are rich in wildlife. Moose and deer feed on the twigs and buds of young saplings, birds and squirrels nest in cavities in mature trees and songbirds find insects and protected nest sites in their leafy canopy. Aspen produces a hardwood that is used by humans to manufacture wood pulp, paper and oriented strandboard products.

Resource Extraction

Unlike agriculture and forestry, which are predominately activities of the south and north respectively, oil and gas exploration and development has occurred in every natural region in Alberta. According to Alberta's *State of the Environment Report on Terrestrial Ecosystems*, about 70 per cent of the energy produced in Canada is from hydrocarbon (oil, natural gas and coal) reserves from Alberta (Alberta Environment 1997). While 23 per cent of the natural gas produced from the province's 45,000 natural gas wells is sold domestically, approximately 77 per cent is exported to the United States and eastern Canada. With demand increasing in the U.S., it is expected that this industry will continue to grow in Alberta. Coal, sand and gravel are also non-renewable resources extracted from the earth.

One of the biggest impacts of resource extraction is the large number of linear corridors developed to locate, produce and deliver product. There are few areas of Alberta not yet criss-crossed by pipelines, cutlines, seismic lines, power lines, fibre-

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Tiger Salamanders and the Trans-Canada Highway

Tiger salamanders are widely distributed in Alberta, but because they are nocturnal, they are rarely seen out in the open. They spend much of their lives in subterranean burrows, congregating briefly at aquatic breeding sites in the spring. In a survey of road kills on the Trans-Canada Highway in Banff National Park, researchers reported 183 tiger salamanders killed while trying to cross the highway to an adjacent wetland during eight days in the fall of 1999 (Clevenger *et al.* 2000).

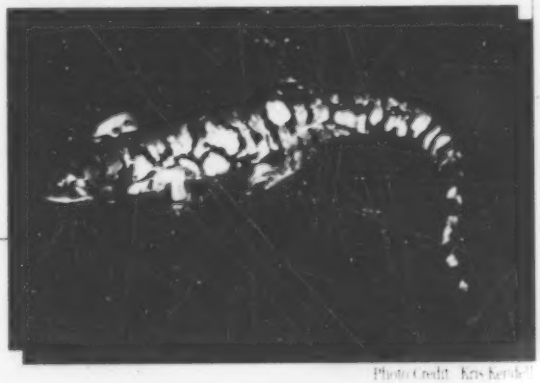

Photo Credit: Ken Kerek

As well, increasing the number of corridors allows for increased access into once-remote areas. Intensive and extensive recreation in prime habitats, including the increasing use of all-terrain vehicles and lake and riverfront recreational properties, can increase the disturbance to wildlife during critical life stages. Recreational activities may go on indefinitely, long after resource extraction activities have ceased.

Climate Change

Complex interactions that lead to global conditions such as a warmer climate also loom on the horizon. One impact of a warming trend may be that a number of species will shift their present-day distribution. Where this brings exotic species into the province, native species may be negatively affected.

Many of the impacts of climate change are interrelated. For example, warmer temperatures may melt the ice and snow of the Rockies and decrease the size of the glaciers that feed prairie rivers. Lower water levels and drier conditions add pressure to wildlife, such as moisture-loving amphibians reliant on aquatic ecosystems.

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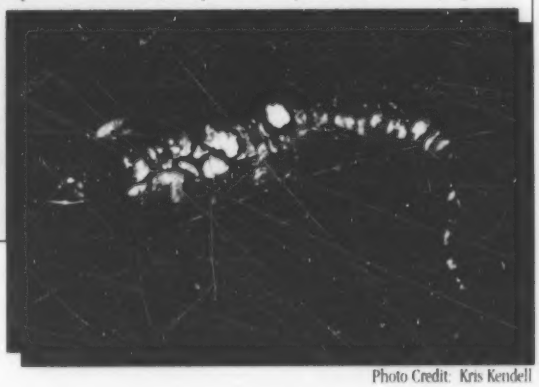

Photo Credit: Kris Kendell

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While some changes brought on by warmer temperatures may be beneficial, other changes may cancel some of the benefits. For example, the Canada Country Study of global climate change concludes that while growth and productivity of the boreal forest ecosystem may improve, disturbances such as fire, insects and diseases may also increase (Herrington *et al.* 1997). Overall, the implications of climate change are extremely complex and not yet well understood.

Political Boundaries

Political boundaries can also present a challenge to wildlife. A set of rules in one jurisdiction may not hold true in another. For migrating species, or a species whose distribution spans more than one jurisdiction, protection may end at the border. In Canada, peregrine falcons are protected as a threatened species. In the United States, this species was removed from the endangered list in 1999. Similarly, when peregrines and other migratory bird species fly south, dangerous chemicals not permitted in Canada may be present. Fortunately, legislators are beginning to take these differences into account when signing trade and other agreements. For example, in 1997, as part of the North American Agreement for Environmental Co-operation between Canada, the U.S. and Mexico, the Commission for Environmental Co-operation (CEC) established a North American Regional action plan that would see the phased reduction of DDT use in Mexico by 80 per cent within five years. (Find out more about DDT and this initiative by visiting the CEC website at http://www.cec.org.)

Urban expansion

Up until the 1940s, Alberta's population was mainly rural and under 800,000. Between 1931 and 1991, the provincial population grew by almost 248 per cent to nearly three million people. With an expanding economy comes an increase in the growth of urban centres and today, approximately 80 per cent of Alberta's population is urban. As cities expand into adjacent rural landscapes, they take more and more agricultural land out of production; they crowd out more wildlife and wildlife habitat and add more pollution to already-taxed air and water systems.

Photo Credit: Gordon Court

Equally significant are the number of recreational properties and acreage developments on the outskirts of Alberta cities, and in areas of scenic beauty such as the Bow corridor. These developments also contribute to the loss of productive soil and wildlife habitat and increase the incidences of negative human-wildlife encounters.

3.4 Summary of Current Pressures on Alberta's Wildlife

While pressure from wildlife harvesting can be effectively managed, interactions between land-users and wildlife are much more complex. The effects of habitat loss on wildlife can be difficult to measure, often requiring long-term and intensive study. For example, while we can count the number of wetlands drained for cultivation or the area cleared of forest, it is more difficult to establish the number of aquatic insects or forest songbirds that were affected by those actions. Common sense, however, tells us that the more habitat that is altered or lost through man's activities, greater is the pressure placed on the wildlife that once occupied them. As more and more of the province's land mass comes under human influence, Albertans must take into account their impact on wildlife and must develop creative solutions to mitigate this impact.

4.0 Actions to Protect Alberta's Wildlife

4.1 Introduction

While the pressures placed on wildlife are growing, there are also a number of initiatives in the province that monitor, mitigate and prevent some pressures from impacting wildlife. Actions may take many forms, such as conducting surveys, monitoring wildlife species through their life cycles, placing restrictions on certain land use activities, setting aside critical habitat or sensitive riparian zones, captive breeding, re-introductions or stocking. As well, these actions may be carried out by a number of agencies, including provincial and federal governments, academic researchers, conservation agencies, individual landowners or concerned citizens.

4.2 Actions to Manage Direct Pressures on Alberta's Wildlife

Harvest Restrictions

For the most part, the provincial government is responsible for setting wildlife harvest restrictions. In setting these restrictions, however, the province often consults with interest groups such as the Alberta Fish and Game Association or the Alberta Professional Outfitters Association. As well, information collected from hunters, anglers and trappers through compulsory registration and user questionnaires helps determine the annual status of certain wildlife populations. When required, studies are undertaken to more clearly define a species' well-being and harvest potential.

While an increasing demand is causing pressure on the fisheries resource, managers are working at a number of creative solutions to keep this resource renewable in the future. Regulations have been altered to set seasons (or closures) that protect spawning and immature fish. Catch-and-release programs encourage the sport without removing the supply. Daily limits have been reduced and

minimum size requirements (designed to allow immature fish to reach maturity) have been set. Programs such as "Report a Poacher" encourage fairness so that everyone can enjoy hunting and sportfishing in Alberta.

While the Alberta government strives to maintain native fish populations wherever they occur, they also use fish raised in hatcheries to supplement populations. This supply is used to re-establish populations that have collapsed, to establish new populations where suitable water bodies occur and to provide the fish for diverse fishing experiences in areas where few angling opportunities exist. In 2000, 7,699,400 trout, walleye and perch were released into 291 water bodies across the province, with the largest releases in Pine Coulee Lake (1,390,000 walleye), Sawn Lake (1,740,000 walleye) and Tyrrell Lake (500,000 rainbow trout).

Funds required for fish stocking are raised from a portion of the fees collected from the sale of hunting and fishing licences and administered by the Alberta Conservation Association (ACA). This not-for-profit society's objectives are to preserve, protect, develop, enhance and promote the conservation of fish and wildlife populations and habitat throughout the province. As such, the ACA is responsible for the Fisheries Habitat Development, Fisheries Management Enhancement, the Wildlife Habitat Development, the Wildlife Management Enhancement, and Report a Poacher programs.

Controlling Exotic Species

The control of exotic pests entering Alberta is regulated by Alberta Sustainable Resource Development, Alberta Agriculture, Food and Rural Development and the Canadian Food Inspection Agency - to ensure exotic species are not inadvertently or deliberately brought into Canada. However, border patrols are costly and time consuming. Instead, public education can make Albertans aware of the damage exotic species can cause. Albertans can take a number of simple actions, such as not bringing firewood in from areas outside the province, or washing boats and fishing gear before travelling from one water body to another.

Where exotic species have already become established in Alberta, eradication programs may be undertaken. In 1999, the Alberta Native Plant Council carried out a program to survey over 1,500 km along several Alberta river systems for new infestations of purple loosestrife. Teams identified 57 infestations of this pervasive exotic plant. Volunteers helped to remove plants and will return to check inventoried sites in the future.

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4.3 Actions to Manage Indirect (Habitat) Pressures

The management of habitat does not come under one realm of authority in Alberta. Instead, many agencies across municipal, provincial and federal jurisdictions, as well as industry, conservation organizations and private landowners, must work co-operatively to deal with habitat issues on a site-by-site basis.

Multiple-Use Land Zoning

In many jurisdictions, local governments control land use through land use zoning. While buffers are established to minimize conflict between industrial and urban development, areas of suitable habitat must also be set aside for wildlife. In Edmonton, the Edmonton Natural Areas Program is striving to check urban sprawl and identify and protect a number of unique natural areas located within city boundaries before they are bulldozed for development. Similarly, many cities in Alberta set aside the habitats located adjacent to rivers for a combination of recreation and wildlife use.

In Alberta, public (or Crown) lands occur throughout the province. To effectively protect wildlife and habitat in these areas, public land managers integrate fish and wildlife management with overall land use activities. For example, wildlife managers have produced a list of conditions for land use near trumpeter swan habitat that limits the timing and proximity of activity in these areas. Through the provincial land use permit system, these conditions are reviewed and must be met by industrial and agricultural users, before activities are permitted. Thus, fish and wildlife managers are often involved in developing various land use guidelines or codes of practice and can articulate wildlife concerns into broader land use management plans. Such integrated resource management is ongoing in many areas throughout the province. (For more information on the Government of Alberta's approach to integrated resource management, visit http://www3.gov.ab.ca/env/irm.html)

Integrated Resource Management

"Integrated resource management recognizes that everything is connected to everything else and that the use of a resource for one purpose can affect both the use of that resource for other purposes and the management and use of other resources."

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Figure 4

Alberta's Protected Areas

Protected Areas

Like zoning special areas for special purposes, sanctuaries, parks and protected areas preserve habitat for a number of wildlife species. Today, Alberta has designated 532 sites of public land (not including five national parks) with some form of protection, including 67 provincial parks, 27 wildland parks, one (Willmore) wilderness park, 266 provincial recreation areas, 16 ecological reserves, three wilderness areas and 152 natural areas. Combined, these protected areas cover approximately two million (or 3 per cent) of Alberta's 66 million hectare landbase (Figure 4).

While some protection is achieved by government initiatives such as the *Special Places 2000* program, many private initiatives also protect wild spaces. Conservation programs like Operation Grasslands encourage landowners to protect habitat on private lands. Landowners can participate voluntarily, or they may formalize protection through land trusts held by organizations like the Nature Conservancy.

Special Places 2000

In response to the World Wildlife Fund (Canada) *Endangered Spaces Program*, Alberta initiated the *Special Places 2000* program in 1992. The goal of this program was to create a network of protected areas with representative examples of the 20 sub-regions that make up the environmental diversity of Alberta's landscape. Between 1995 and 2000, 76 sites were designated under this initiative, adding approximately 1.3 million hectares to Alberta's parks and protected areas.

Habitat Rehabilitation

Where habitat cannot be zoned or protected for wildlife, other initiatives are needed to compensate wildlife in multiple land use areas. For over 50 years, Ducks Unlimited Canada has been involved in a number of partnerships, like the North American Waterfowl Management Plan, that work to restore and protect habitat for waterfowl and other wetland species. More recently, initiatives like the Cows and Fish Project and the North Saskatchewan Watershed Alliance work towards resolving habitat issues to the benefit of a variety of stakeholders, including wildlife.

North American Waterfowl Management Plan

The North American Waterfowl Management Plan (NAWMP) is an agreement between Canada, the United States and Mexico to conserve habitats important to waterfowl on a continental scale. In 1999/2000, nearly $16.3 million was invested in Alberta, and more than 45,400 hectares of wetlands and uplands were conserved for wildlife.

Prairie Habitat Joint Venture at Majorville Medicine Wheel

At the Majorville Medicine Wheel in southern Alberta, the Prairie Habitat Joint Venture (a program under the North American Waterfowl Management Plan) worked with local ranchers in a 47,000-acre area to improve native grasslands and wetlands for waterfowl and other wildlife and cattle. Old irrigation canals were used to stabilize existing wetlands and create 36 new ones. New fencing allowed for a rotational grazing system that benefited both livestock and wildlife. The Medicine Wheel project has been called "a model of economically and environmentally sustainable agriculture in action."

Whether designating protected areas or effectively managing multiple land uses, most land managers today have recognized the importance of and are striving to conserve biodiversity. In 1995, the Government of Alberta, along with the governments of other provinces, territories and Canada, committed to using the *Canadian Biodiversity Strategy* as a guide for conserving biodiversity and ensuring the sustainable use of biological resources. More about the programs established by the Alberta government to meet these guidelines can be found in the report, *Sustaining Alberta's Biodiversity* (Alberta Environmental Protection 1998). This report can be downloaded from http://www3.gov.ab.ca/env/resedu/biodiversity/index.html.

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4.4 Species at Risk in Alberta

Although managers are striving for the conservation of all species and their habitats, the reality is that like many other places around the world, some species in Alberta are already at risk. In Alberta, species at risk have been recognized since 1977 when the American white pelican and double-crested cormorant were first listed as "endangered" under the *Wildlife Act*. As well as listing species, this Act also provides for the legal protection of nests or dens and fines for anyone disturbing, killing or trafficking in endangered animals.

Co-operative efforts and processes to identify species at risk have been in place for many years. Nationally, wildlife species are assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), a body of scientific experts created in 1977 to identify species at risk of extirpation or extinction in Canada. In 1988, the Recovery of Nationallly Endangered Wildlife (RENEW) committee was formed to prepare and implement recovery plans for threatened and endangered species. These two programs work co-operatively to identify and recover species at risk in Canada. To further increase co-ordination among federal, provincial and territorial jurisdictions, the 1996 Wildlife Ministers Council committed to the *Accord for the Protection of Species at Risk in Canada*. This accord makes a commitment to a national approach to identifying and conserving species at risk. The general status review process, and changes to the *Wildlife Act* to include any endangered animal, fish, plant or invertebrate, are two examples of how Alberta is meeting these commitments.

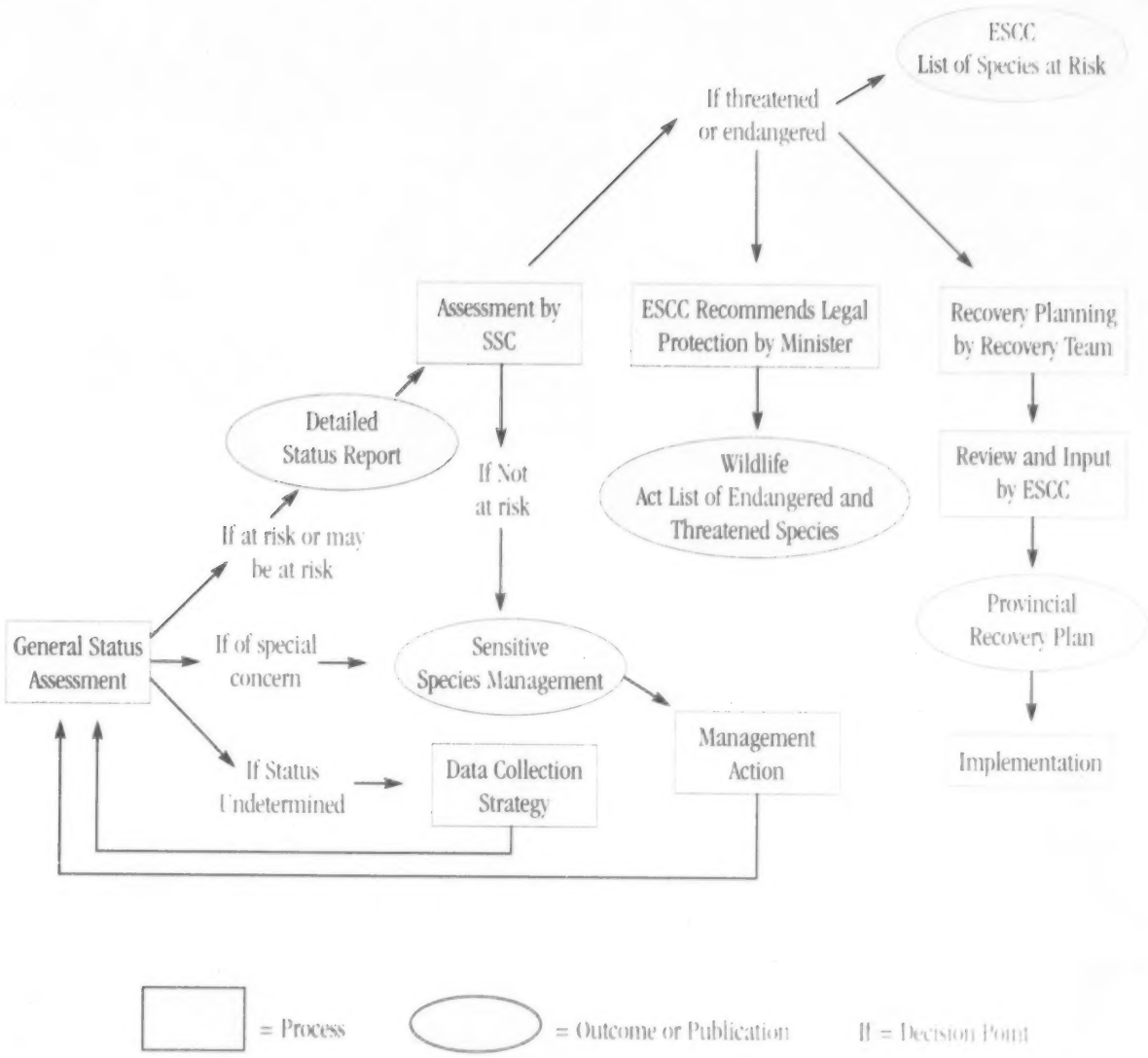
As well, Alberta's Endangered Species Conservation Committee (ESCC) was created in 1998. The ESCC is a broad stakeholder group including scientists, government and corporate land managers, resource based land users and conservation organizations. After careful review of species assessments and recommendations by its Scientific Subcommittee (SSC), the ESCC advises the Minister responsible for wildlife on matters relating to the identification, conservation and recovery of species at risk. The committee recommends which legal designation (endangered or threatened) a species at risk should receive, what focus recovery plans it should have, and what conservation actions are required immediately to prevent further risk or loss of the species until the recovery plan is implemented.

The World Conservation Union's Red List

According to the World Conservation Union's Red List, one in five mammal species and one in eight bird species are threatened with extinction worldwide. This list includes 1,130 mammals, 1,183 birds and thousands of other species including amphibians, insects and plants. The organization attributes human activity as the cause of the 816 extinctions known to date.

Figure 5

Alberta's Strategy for Identifying Species at Risk



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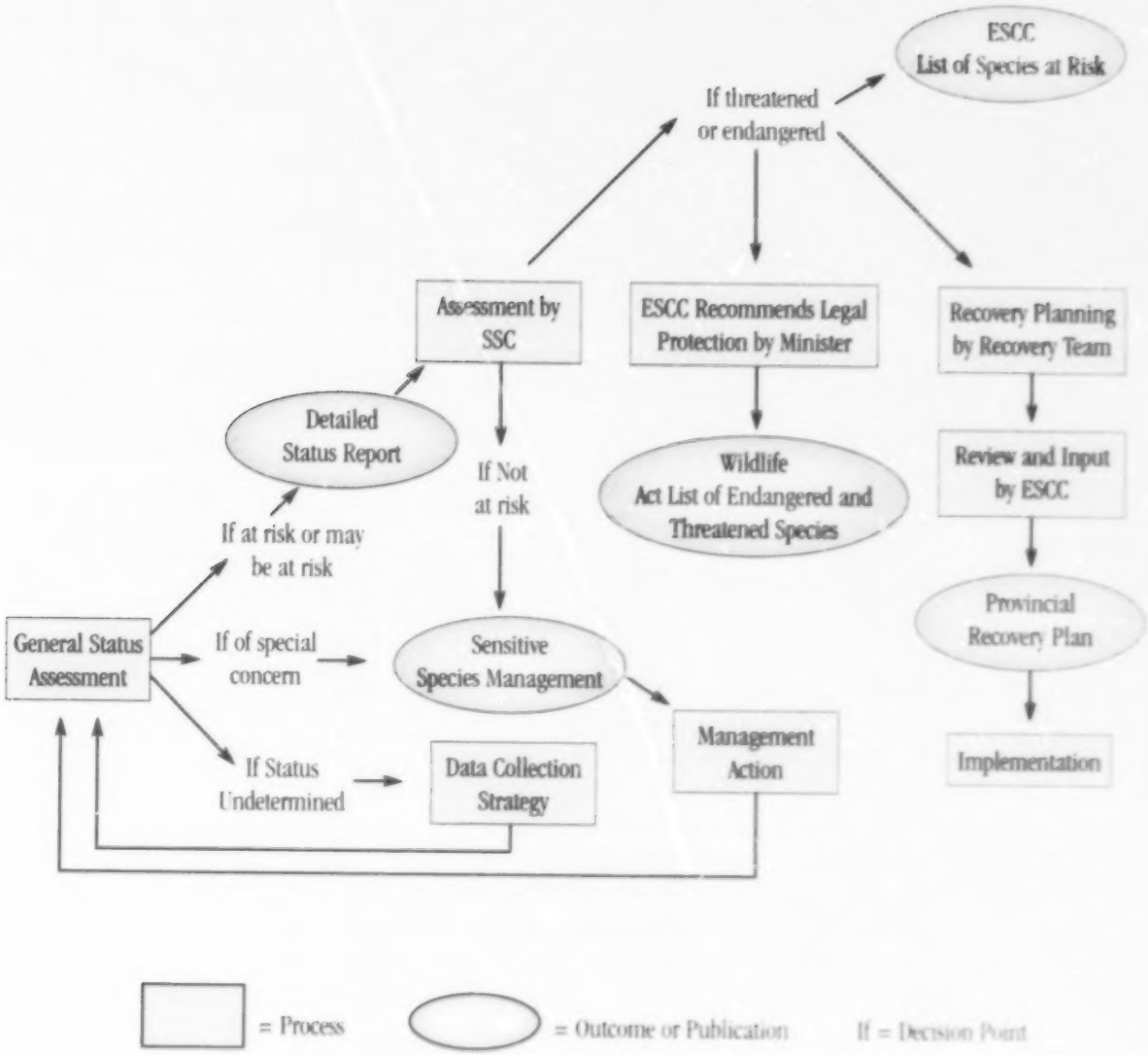

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Inventories, management and recovery programs are ongoing for a variety of species at risk. Work on Alberta's first two endangered species, the pelican and cormorant, resulted in these species' recovery and removal from the endangered species list. Other recovery programs such as peregrine falcon and swift fox reintroductions have met with great success. Sometimes, a recovery plan may call for more study of the species. This is the case for the burrowing owl, a species that may be limited by a lack of food on its breeding ground, as well as a shortage of habitat in its wintering grounds.

Endangered Species Conservation Committee

Based on recommendations made by the ESCC, the Minister in June 2000 made several regulatory changes to species identified at risk under the *Wildlife Act*. One of these changes was to downlist the peregrine falcon from endangered to threatened. After several decades of management, peregrine falcon populations have grown to about 50 pairs in the province and this species is expected to make a full recovery.

As well as identifying species as endangered or threatened, other legislated actions include creating a new category for "species of special concern" such as the Sprague's pipit, a small grassland songbird. The prairie rattlesnake is not listed in a specific at risk category but has had its seasonal protection (of individuals and their dens) extended to year-round protection. In some cases, a species' listed status may remain the same but actions to protect the species may change. Although burrowing owls have declined in Canada, some populations remain stable in Alberta. This species remains in the threatened category but actions, such as protecting nest sites, have been strengthened and monitoring carried out to collect more information before a change in status is made. Similarly, the swift fox remains endangered but new monitoring and conservation agreements will be carried out to assist this species' recovery.

As well as working within the province, Alberta continues to co-operate with its national and provincial counterparts. A variety of plans are being developed to implement the Accord for the Protection of Species at Risk in Canada as well as to develop new terms of reference for COSEWIC, RENEW and the Canadian Endangered Species Conservation Council.

4.5 Summary of Actions to Protect Alberta's Wildlife

When implemented properly and adhered to by everyone, management strategies are effective in allowing for a sustainable harvest of certain game species. Disease, starvation, or predation are to be expected in natural populations and usually require little management except to ensure natural stresses are not compounded by human activities. Habitat loss is the biggest threat facing Alberta's wildlife today. While a small area can be protected for wildlife, the reality is that today's increasing human population and expanding economy will force more and more users onto a finite land base. Wherever possible, integrated land management must take into account the needs of wildlife. Where needs cannot be met, assessment programs must quickly identify species of concern, ensuring that actions are taken to prevent species from becoming at risk.

The Upland Game Bird Shelterbelt Program

While the introduction of non-native species is largely frowned upon today, the introduction of ring-necked pheasants and gray (Hungarian) partridge early in the century in Alberta probably had positive effects on the local landscape. As early as 1907, the Calgary Fish and Game Protective Association (today the Alberta Fish and Game Association), among other things, undertook an ambitious campaign to introduce several game bird species into the province. Releases eventually led to the study of both exotic and native species and, eventually, to habitat improvement projects. In 1959, an Upland Game Bird Shelterbelt Program was initiated to the benefit of many wildlife species. The project was also a model of co-operation - provincial biologists selected the sites; the Department of Agriculture supplied the trees and shrubs; local Fish and Game Association members planted them; with further care the responsibility of farmers. Today, many agencies including government biologists, conservationists and land stewards, are coming together to protect the endangered sage grouse and its habitat in southern Alberta.

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5.0 Conclusion

5.1 What are some Important Trends concerning Wildlife in Alberta?

Alberta's former approach to wildlife management focused on the maintenance of individual game species like white-tailed deer, beaver or walleye. This approach has shifted in the past few decades as wildlife managers recognize the non-consumptive and ecological values of wildlife, as well as the need to conserve all biodiversity and to maintain basic ecological processes. Managers have also shifted from single-species management to habitat or landscape management, and efforts are being made to extend this knowledge to broadly-based ecosystem management that takes into consideration ecological, social and economic factors.

However, despite improvements in wildlife management, some species are currently at risk and must be adequately protected. Protection can be through legislation such as the *Wildlife Act* or the proposed federal *Species At Risk Act*, or through consultative processes (like the Endangered Species Conservation Committee) where a combination of stakeholders determine the course of action. Where habitat is a limiting factor for species at risk, it too must be protected. The protection of habitat is probably the largest and most contentious issue facing wildlife managers today. While initiatives to increase protected areas across the province can benefit a variety of species, failing to restrict industrial and recreational developments within these areas reduces their value to some wildlife populations. Equally important is ensuring that the level of use on non-protected lands allows room for healthy ecosystems and wildlife populations.

The trend that will likely challenge wildlife managers most in the near future is the increasing growth of the human population and the associated demands placed on the landscape and wildlife resource. Increased industrial activity to extract resources needed by a burgeoning human population also brings increasing access and disturbance to many wildlife populations and their habitats. With these increasing pressures, the problems facing wildlife today are likely going to become more complex with time.

Fortunately, there is also a trend towards an increase in public awareness and concern for all species. Stakeholders and landowners are playing an increasing

role in pursuing conservation initiatives. People living in urban areas are showing greater concern for actions upstream of their drinking water, air, and where and how their food is produced. The need for co-operation is being recognized through joint ventures and alliances between industry, conservation groups and government agencies. Plans for integrated resource and land management require innovative and co-operative partnerships that meet challenges of the new millennium.

Ag Initiatives 2000

In the first half of 2000, a unique initiative took place in Alberta. Over 1,500 stakeholders invested time and energy into a process that examined every aspect of the agriculture and food industry. Working together, participants developed a long-term vision that called for "the continued growth of a profitable and *environmentally sustainable* agriculture and food industry in Alberta..." As well, an Environmental Stewardship Incentive Program Action Team was formed to address issues pertaining to integrated land use, sustainable land management practises and responsible stewardship.

As Alberta approaches its centennial in 2005, wildlife managers can look back on 100 years of wildlife management in the province. While some species have come perilously close to extinction, changes in management practises, recovery plans and reintroduction programs have countered many of these declines. As well, several processes that gather information on all species, identifying sensitive species before they become at risk, have been implemented to ensure timely action is taken before a species becomes at risk.

Living By Water

As an example of a project that bridges the gap between wildlife management and managing habitat for wildlife, the Living By Water Project is an initiative to assist landowners living by lakes, rivers or other water bodies to make their homesite more ecologically friendly. Homesite assessments identify areas where landowners can improve the natural condition of their shoreline; making as little impact on nature as possible and encouraging wildlife to remain in the area. For more information, visit http://www.livingbywater.ca

LIVING BY WATER

Working towards healthier human and wildlife habitat along the shorelines of Canada

5.2 What Can You do to Help Alberta's Wildlife?

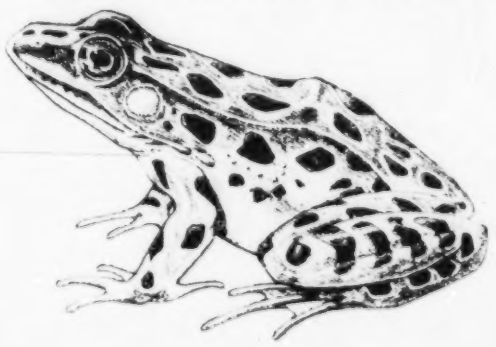
Because it belongs to all of us, keeping the state of our wildlife healthy and off the "at risk" list is the responsibility of all Albertans. The decisions and actions we make every day have an impact on other species and it is our responsibility to ensure those decisions are wise ones.

Actions as simple as not littering are important to uphold as well as to teach to others. Practising the 3 Rs of Reduce, Reuse and Recycle helps lessen the demand for natural resources. Lowering the thermostat a few degrees or using compact fluorescent light bulbs are also ways of lessening the demand for energy. Using public transit, riding a bike or car-pooling not only saves energy, it also cuts down on air pollution. Making your consumer choices wisely can lessen the impact you make on wildlife. Did you know choosing shade-grown coffee can ensure that the winter habitat of many of Alberta's songbirds is protected?

Deciding not to cultivate a wetland or maintaining a private woodlot are simple ways of sharing space. Limiting the use of pesticides or using native plants to turn a backyard lawn into a butterfly garden help maintain wildlife in urban areas. Joining a local natural history club or a regional land-use planning committee are ways of actively learning about and protecting the natural resources around us. The possibilities are endless! Respecting wildlife and giving it adequate space to live and reproduce will ensure this resource is maintained for everyone's benefit - today and in the future.

Get involved - Take part in the Canadian FrogWatch Program

Frogwatch is a national volunteer monitoring program designed to monitor frog populations across Canada. Volunteers are asked to listen for male frogs calling during the spring breeding period, recording what frogs are calling at a particular site, when they are calling, under what conditions they are calling and whether they are still calling there the next year. In Alberta, this program is co-ordinated by the Alberta Amphibian Monitoring program. For more information, write to the Alberta Amphibian Monitoring Program at 7th floor, O.S. Longman Building, 6909 - 116 Street, Edmonton, AB T6H 4P2.



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Ag Initiatives 2000

In the first half of 2000, a unique initiative took place in Alberta. Over 1,500 stakeholders invested time and energy into a process that examined every aspect of the agriculture and food industry. Working together, participants developed a long-term vision that called for "the continued growth of a profitable and *environmentally sustainable* agriculture and food industry in Alberta..." As well, an Environmental Stewardship Incentive Program Action Team was formed to address issues pertaining to integrated land use, sustainable land management practises and responsible stewardship.

As Alberta approaches its centennial in 2005, wildlife managers can look back on 100 years of wildlife management in the province. While some species have come perilously close to extinction, changes in management practises, recovery plans and reintroduction programs have countered many of these declines. As well, several processes that gather information on all species, identifying sensitive species before they become at risk, have been implemented to ensure timely action is taken before a species becomes at risk.

Living By Water

As an example of a project that bridges the gap between wildlife management and managing habitat for wildlife, the Living By Water Project is an initiative to assist landowners living by lakes, rivers or other water bodies to make their homesite more ecologically friendly. Homesite assessments identify areas where landowners can improve the natural condition of their shoreline; making as little impact on nature as possible and encouraging wildlife to remain in the area. For more information, visit http://www.livingbywater.ca

5.2 What Can You do to Help Alberta's Wildlife?

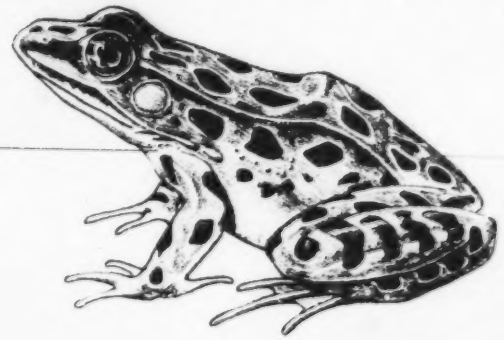
Because it belongs to all of us, keeping the state of our wildlife healthy and off the "at risk" list is the responsibility of all Albertans. The decisions and actions we make every day have an impact on other species and it is our responsibility to ensure those decisions are wise ones.

Actions as simple as not littering are important to uphold as well as to teach to others. Practising the 3 Rs of Reduce, Reuse and Recycle helps lessen the demand for natural resources. Lowering the thermostat a few degrees or using compact fluorescent light bulbs are also ways of lessening the demand for energy. Using public transit, riding a bike or car-pooling not only saves energy, it also cuts down on air pollution. Making your consumer choices wisely can lessen the impact you make on wildlife. Did you know choosing shade-grown coffee can ensure that the winter habitat of many of Alberta's songbirds is protected?

Deciding not to cultivate a wetland or maintaining a private woodlot are simple ways of sharing space. Limiting the use of pesticides or using native plants to turn a backyard lawn into a butterfly garden help maintain wildlife in urban areas. Joining a local natural history club or a regional land-use planning committee are ways of actively learning about and protecting the natural resources around us. The possibilities are endless! Respecting wildlife and giving it adequate space to live and reproduce will ensure this resource is maintained for everyone's benefit - today and in the future.

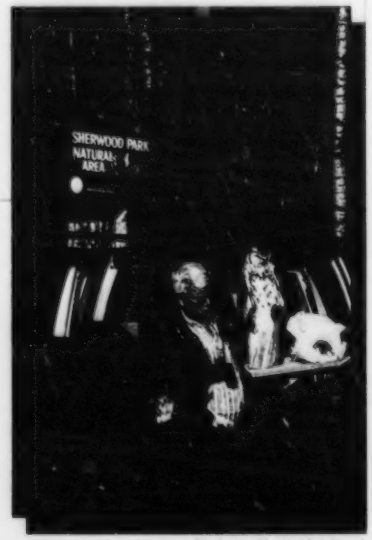
Get involved - Take part in the Canadian FrogWatch Program

Frogwatch is a national volunteer monitoring program designed to monitor frog populations across Canada. Volunteers are asked to listen for male frogs calling during the spring breeding period, recording what frogs are calling at a particular site, when they are calling, under what conditions they are calling and whether they are still calling there the next year. In Alberta, this program is co-ordinated by the Alberta Amphibian Monitoring program. For more information, write to the Alberta Amphibian Monitoring Program at 7th floor, O.S. Longman Building, 6909 - 116 Street, Edmonton, AB T6H 4P2.



Get involved - Join a local Natural History Club!

So, you want to hang out with a bunch of cool outdoor, natural history types but aren't sure where to find them? Check out the Federation of Alberta Naturalists (FAN) website at http://www.fanweb.ca/ or contact FAN at 11759 Groat Road, Edmonton, AB. T5M 3K6 for information on 24 plant, bird and naturalist organizations located across the province. From the Wood Buffalo Wild Bird Club and Fort McMurray Field Naturalists Society to the Grasslands Naturalists and the Bow-Kan Birders, there's something for everyone - a great way to learn about and appreciate wildlife and other natural elements in your area.



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Glossary

Biodiversity	the diversity or variety of life on earth.
Distribution	the total area in which a species occurs.
Density	the number of individuals of a species in a defined unit of area.
Ecology	the study of the relations of animals and plants and their communities to their surroundings.
Ecosystem	an association of living things and their interactions with each other and the environment.
Environmental indicators	key measurements that can be used to monitor, describe, and interpret changes in the environment.
Exotic Species	a species that is not native to the place that it is found (i.e. it has been brought in or "introduced" from another area).
Game	wild animals that are hunted for sport or food.
Habitat	the food, water, shelter and space an animal or plant needs to live.
Hardwood	the wood of a deciduous tree as opposed to softwood, the wood of coniferous trees. Mixedwood forests have a mix of both deciduous and coniferous species.

Harvest	the act or process of gathering food, timber, fur or other natural products.
Predation	the act of preying or killing.
Species	a classification of individuals that share common attributes, have a common name and interbreed with one another.
Vascular plants	have a specialized water transport system that is absent in **non-vascular** plants.
Vertebrates	a group of animal species that possess a backbone as opposed to **invertebrate organisms** that lack a backbone.
Wildlife	a common term used to encompass the large range of wild plants and animals that grow without taming or cultivation by people. Alberta's wildlife includes many species of mammals, birds, fish, amphibians, reptiles, plants (flowering, mosses, lichens, etc.) and invertebrates (worms, snails and clams, spiders, beetles, etc.).

8.0 Appendix I

Resources Available for Further Information.

Useful References

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On the World Wide Web

Ag Summit 2000 - http://www.agrivantage.ab.ca/index.htm

Alberta Environment - http://www3.gov.ab.ca/env/

Alberta Natural Heritage Information Centre - http://www3.gov.ab.ca/env/parks/anhic/infosite.html

Alberta Special Places - http://www3.gov.ab.ca/env/parks/sp_places/

Alberta Sustainable Resource Development - http://www3.gov.ab.ca/srd/index.html

Alberta's Species at Risk - http://www3.gov.ab.ca/srd/fw/riskspecies/

Beaverhill Bird Observatory - http://www.bsc-eoc.org/national/bbo.html

Canadian Wildlife Service (Environment Canada) - http://www.cws-scf.ec.gc.ca/cwshom_e.html

Committee On the Status of Endangered Wildlife In Canada (COSEWIC) - http://www.cosepac.gc.ca/

Ducks Unlimited Canada - http://www.ducks.ca

Federation of Alberta Naturalists - http://www.fanweb.ca/

Foothills Model Forest - http://www.fmf.ab.ca/

Land Stewardship Centre of Canada - http://www.landstewardship.org

Living By Water - http://www.livingbywater.ca

Canadian Forest Service - http://www.nrcan.gc.ca/cfs-scf/

Nature Conservancy of Canada - http://natureconservancy.ca/files/index.asp

Status of Alberta Wildlife - http://www3.gov.ab.ca/srd/fw/status/

As well, a list of materials available from Alberta Environment is online at Alberta Environment's Information Centre Web site, http://www3.gov.ab.ca/env/info/infocentre/

9.0 Appendix II

Species At Risk in Alberta

(As per Canadian Endangered Species Conservation Council 2001)

Extinct	Birds:	Greater Prairie Chicken, Passenger Pigeon, Eskimo Curlew
	Fish:	Banff Longnose Dace
	Mammals:	Black-footed Ferret
At Risk	Amphibians:	Northern Leopard Frog
	Birds:	Burrowing Owl, Ferruginous Hawk, Peregrine Falcon, Piping Plover, Sage Grouse, Trumpeter Swan, Whooping Crane
	Fish:	Shortjaw Cisco
	Mammals:	Swift Fox, Wood Bison, Woodland Caribou
May Be At Risk	Amphibians:	Canadian Toad, Great Plains Toad, Plains Spadefoot Toad
	Birds:	Long-billed Curlew, Short-eared Owl
	Butterflies:	Weidemeyer's Admiral
	Ferns:	Aleutian Maidenhair-fern, Alpine Lady Fern, Boareal Moonwort, Crenulate Monwort, Created Shield Fern, Fragile Rock-brake, Hairy Water Fern, Lace Lip Fern, Least Grape-fern, Male fern, Mingan's Moonwort, Mountain Bladder Fern, Northern Beech Fern, Northern Moonwort, Peculiar Moonwort, Prairie Dunewort, Rock Polypody, Siberian Polypody, Smooth Cliff-brake, Smooth Woodsia, Spoon-leaf Moonwort, Western Moonwort, Western Polypody, Gastony's Cliff-brake
	Fish:	Shorthead Sculpin, Pygmy Whitefish, Spoonhead Sculpin, Western Silvery Minnow
	Mammals:	Grizzly Bear, Long-tailed Weasel, Northern Bat, Ord's Kangaroo Rat, Wandering (Vagrant) Shrew, Wolverine
	Orchids:	Bog Adder's-mouth, Broad-leaved Twayblade, Mountain lady's slipper, Pink Lady's-slipper, Slender Bog-orchid, Slender Ladies'-tresses, Western Twayblade, White Adder's-mouth
	Reptiles:	Prairie Rattlesnake, Short-horned Lizard, Western Hognose Snake

Sensitive:

Amphibians: Columbia Spotted Frog, Long-toed Salamander, Western Toad

Birds: American Bittern, American White Pelican, Baird's Sparrow, Bald Eagle, Barred Owl, Bay-breasted Warbler, Black Tern, Black-backed Woodpecker, Black-crowned Night Heron, Blackburnian Warbler, Black-necked Stilt, Black-throated Green Warbler, Bobolink, Brewer's Sparrow, Broad-winged Hawk, Common Nighthawk, Canada Warbler, Cape May Warbler, Caspian tern, Clark's Grebe, Forster's Tern, Golden Eagle, Grasshopper Sparrow, Great Blue Heron, Great Gray Owl, Great-crested Flycatcher, Harlequin Duck, Horned Grebe, Lark Bunting, Loggerhead Shrike, Lewis' Woodpecker, Mountain Plover, Northern Goshawk, Northern Pygmy Owl, Osprey, Pied-billed Grebe, Pileated Woodpecker, Prairie Falcon, Purple Martin, Sandhill Crane, Sedge Wren, Sharp-tailed Grouse, Sprague's Pipit, Swainson's Thrush, Swainson's Hawk, Upland Sandpiper, Western Grebe, Western Tanager, White-faced Ibis, White-winged Scoter

Butterflies: Afranius Duskywing, Alberta Arctic, Arrowhead Blue, Boisduval's Blue, Edward's Fritillary, Gillette's Checkerspot, Gorgone Checkersport, Gray Copper, Lorquin's Admiral, Monarch, Moss' Elfin, Mountain Fritillary, Nevada Skipper, Old World Swallowtail, Riding's Satyr, Rocky Mountain Dotted Blue, Sagebrush Checkerspot, Shasta Blue, Sheridan's Hairstreak, Uncas Skipper

Ferns: American Rock-brake, Bracken Holly Fern, Fragrant Cliff Wood Fern, Green Spleenwort, Moonwort Grape-fern, Mountain Cliff Fern, Northern Holly Fern Oregon Woodsia, Ostrich Fern, Rusty Woodsia, Shield Fern, Slender Lip Fern

Fish: Arctic Grayling, Bull Trout, Lake Trout, Largescale Sucker, Northern Redbelly Dace, Northern Squawfish, Sauger

Mammals: Badger, Bobcat Canada Lynx, Cougar, Fisher, Olive-backed Pocket Mouse, Pronghorn (Antelope), Red-tailed Chipmunk, Water Vole, Western Small-footed Bat

Orchids: Alaskan Orchid, Menzie's Rattlesnake-plantain, Small Round-leaved Orchid, Spotted Coral-root, Striped Coral-root, White Bog-orchid

Reptiles: Bullsnake, Plains Garter Snake, Red-sided Garter Snake, Wandering Garter Snake, Western Painted Turtle

10.0 Reader's Feedback

Alberta State of the Environment Report - Wildlife

Your response to this survey will help us improve the quality of future Alberta State of the Environment Reports!
Please complete the following feedback form and fax or mail it to:

Alberta Environment
Public Education and Outreach Branch
Main Floor, Oxbridge Place
9820 - 106 Street
Edmonton, Alberta T5K 2J6
fax: (780) 422-4086

1. How would you describe yourself as a reader of this report? Please check the most appropriate category.

_____ Student
_____ Teacher/Professor
_____ Government worker
_____ Private business worker (Please specify type of business: _____)
_____ Environmentalist
_____ An interested individual
_____ Other (Please specify: _____)

2. How did you obtain your copy?

_____ I received a copy by mail
_____ I picked up a copy from an Alberta Environment office
_____ I viewed or downloaded a copy from the Internet
_____ I viewed or borrowed a copy from a library
_____ Other (Please specify: _____)

3. For what purpose(s) will you use this report?

_____ To learn about wildlife in general
_____ To assess the state of Alberta's wildlife
_____ To extract specific environmental data
_____ Other (Please specify: _____)

4. Overall, do you find this report to be:

_____ Very useful
_____ Somewhat useful
_____ Not very useful

Comments _____

_____

_____

_____

5. In your opinion, how well is this report organized and written?

A) This report is:
_____ Very well organized
_____ Fairly well organized
_____ Not well organized

B) The information is:
_____ Very interesting
_____ Fairly interesting
_____ Boring

C) The content is:
_____ Comprehensive
_____ Adequate
_____ Lacking in certain areas

D) The report is:
_____ Very well written
_____ Fairly well written
_____ Not well written

E) The tables and figures in the report are:
_____ Very good
_____ Adequate
_____ Not very good

Comments: _____

6. What did you most like and dislike about this report?

Liked: _____

Dislike: _____

7. Any other comments or suggestions for improving future reports?

_____

Thank you for your time and cooperation!